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SUCCESS WITH POULTRY

A Book on Successful and Profitable Poultry Raising Containing Valuable Information for Persons Who Think of Engaging in any Branch of the Poultry Business for Profit.

Price One Dollar

FIFTH EDITION.

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Success With Poultry.

FIFTH EDITION.

A Book on Successful and Profitable Poultry Raising Containing Valuable Information for Persons Who Think of Engaging in any Branch of the Poultry Business for Profit.

WRITTEN AND COMPILED BY

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EDITOR RELIABLE POULTRY JOURNAL.

PUBLISHED BY
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INV. '60

YAMAU
INCUBATOR CO.
QUINCY, ILL.

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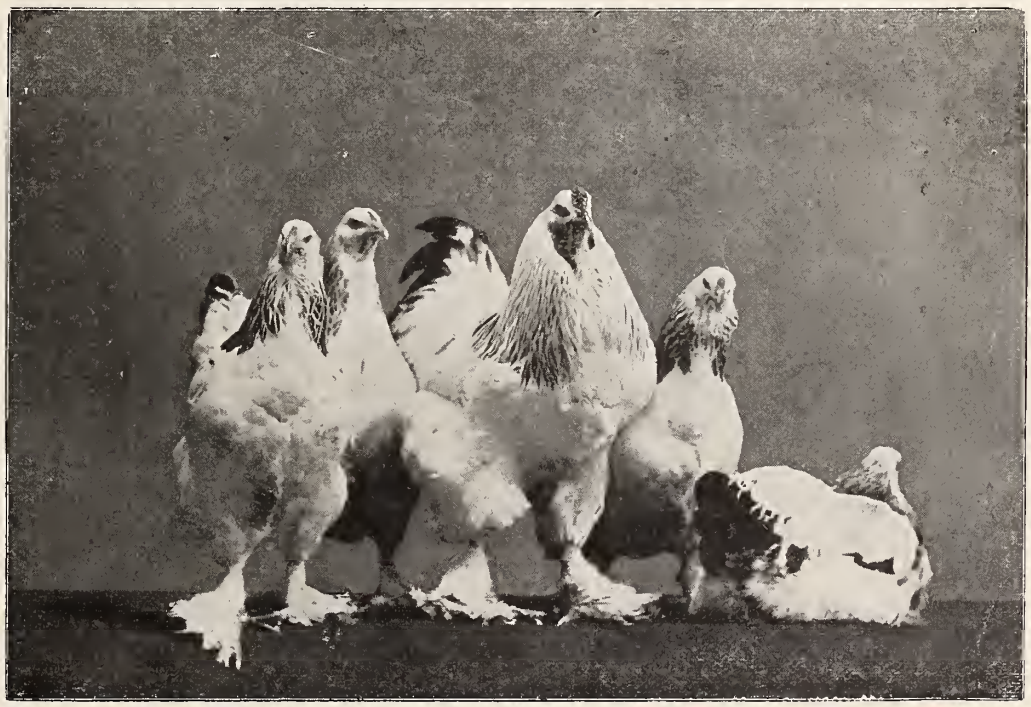
INTRODUCTORY.

THIS book is to be compiled in dead earnest. Poultry keeping may be a fad with a limited few but in a vast majority of cases it is a serious matter, a question of bread and butter, of a livelihood, and any book written or compiled on the subject of Success with Poultry should view the poultry business in this light. We shall not put into this book a single statement nor a bit of advice in which we have not full confidence. We do not wish to misrepresent in the least, or to deceive anybody. We do hope that this book may be the means of helping a large number of people who wish to better their condition in life and are in a position to handle poultry with both pleasure and profit. We shall put into this book, therefore, only the best information and best advice at our command, doing so with a full understanding of our responsibility.



A Pen of Light Brahmas as Bred by Mrs. Ella Thomas. —*From Photograph.*

Success with Poultry depends upon much the same things that success does in any undertaking or business enterprise. To be successful in any line of work slothful, careless, extravagant habits must give way to thrifty, pains-taking and economical methods. Thought must be put into your work.

Cause and effect must be studied; all the details must be looked after with intelligent care, and the hand that receives the income must constantly watch the hand that pays out. There is money—"good money", as the saying goes—to be made out of poultry, but this business like any other, must be learned before great things can be accomplished. Like other human enterprises, poultry-raising pays better and better accordingly as you put more and more thought into the business. In the poultry business, above all others, ordinary common sense is the thing most needful.

It is not within the scope of this book to cover every case, but no matter where we go, certain things are true about poultry and poultry keeping, among the number being these: That poultry and eggs at all times of the year meet with a ready sale for cash; that as a rule the price of poultry and eggs does not fall below the cost of production, where intelligent methods are employed; that extra or gilt-edged prices can everywhere be obtained for gilt-edged stock, that is. for extra choice, uniform and neatly dressed fowls and strictly fresh eggs; that it costs practically no more when one is rightly equipped for the work to produce a gilt-eged article than an inferior one; that by the proper use of artificial means the highest market price can be obtained at all seasons of the year; that by adopting up-to-date methods, hundreds of dozen of eggs can be produced during the season of the year when they will command the higher prices, and that hundreds, yes, thousands of chickens or ducklings can now be raised with success and profit on a comparatively small plat of ground. A surprising amount of poultry and eggs can be produced on an acre of ground, while a full-fledged farm can be conducted on a five acre piece, where knowledge and good sense go hand in hand.

Not all men are qualified to succeed to the same extent, but we claim it is fair to cite exceptional cases of success in the poultry business, where the methods employed and the man or woman who employs them is not a wonder-worker in any way, except that he or she has put heart and brains into the work. There are several branches of the poultry business that are separate and distinct from each other, although a number of successful men and women whom we know combine two or more branches of the business with success. What one man or woman has done, or is doing, others can do; hence, when we cite actual cases of success that have come under our personal observation, we feel that we are simply pointing out what others can do.

It is no doubt true that where one person succeeds with poultry several fail. If this were not true there would be no excuse for publishing this book, the chief object of which is to describe success as it exists, and to explain fully how it was achieved. It is not the object of this book to induce thoughtless, heedless persons to rush pell-mell into poultry raising. All such persons will do well to give poultry raising a wide berth. Their habits will not win in this business. We do not mean to convey the idea that it takes a specially

high order of intelligence to succeed with poultry, for it does not, but we are frank enough to warn the reckless, the shiftless and the indolent that they will make a flat failure with poultry.

The So-Called Fancy Poultry Business.

Let us describe briefly the leading branches of the poultry business. We hear most about the fancy or standard-bred poultry business, and for good reasons, for no doubt it is really the most important when we come to consider how insignificant the poultry industry was thirty to fifty years ago as compared with what it has grown to be at the present day, the great change being due very largely to the work of fanciers, so-called, in breeding to a standard, that is, to different types, and ideals, founded as a rule, on the secure basis of combined utility and beauty. By "fancy" in poultry is meant, that which is pleasing to look at—the beautiful in form and feather. By "utility" is meant size, vigor, color of skin, egg production, etc., and the ability of a type to reproduce in its progeny those qualities that are especially desirable in market poultry. Persons who are not posted on the subject of standard-bred poultry can have no idea of what is meant when we say that there are over one hundred distinct varieties of standard poultry, ranging in weight all the way from a few ounces in the case of bantams, to Mammoth Bronze turkeys weighing, in exceptional cases, as high as forty-five to fifty pounds. The writer once saw and lifted a Mammoth Bronze turkey tom (gobbler) which weighed fifty-two pounds.

So far as egg yield is concerned, the average American hen, as set forth by the census of 1890, lays less than 100 eggs per year. On the other hand, as a result of the work done by the intelligent fancier or breeder, flocks of Leghorns running fifty to a pen, including 600 fowls in all, have been made to average 194 eggs in 365 days, while in other cases smaller flocks consisting of from eight to twenty-four hens have averaged, according to what were believed to be reliable reports, from 220 to 288 eggs per hen in 365 days. Many hen-men are disposed to dispute these last stated averages, but that is a common failing with mankind. That which a man tries hard to do but fails to accomplish, he is prone to deny when credited to others. A man whose hens lay only three or four clutches of eggs a year, and this means the average farmer, will be as quick to dispute the statement that 600 hens of any variety could possibly average 194 eggs per year as is the average man to dispute the statement that eight White Plymouth Rocks ever succeeded in laying an average of 288 eggs in 365 days. Possibly, just possibly no eight hens ever did this, but we have enough faith in mankind to recall a Biblical admonition to the effect that the man who hath said in his heart, all men are liars is—mistaken. We leave this subject for the time being, simply referring the reader to a chapter in this book entitled "Feeding for Eggs," which gives an account of an actual egg contest conducted by a well known and highly reputable stock and farm paper, in which are given the results accomplished by six different pens of fowls, together with an interesting and valuable account by the respective owners of how these fowls were housed, fed and cared for. We also call the readers' careful attention to a table printed in this book entitled "Characteristics of Breeds." It will be of help to investigators of the poultry subject when they come to select the breed or variety they desire to handle. Suffice it to add that in numerous well authenticated cases individual hens have averaged from 200 to 230 eggs each per annum.

The Standard of Perfection.

The American Standard of Perfection, a book of some 250 pages, is often referred to as the national guide of poultrymen. This book is published under copyright by the American Poultry Association, a national organization devoted to the advancement of the poultry industry. In this book each class, breed and variety is set forth, and each and every variety is described with great care as to size, form and color, and every breeder is aiming to produce fowls from year to year that will come as near as possible to the standard requirements. Wonderful progress has been made by intelligent and persevering breeders, and the choicest specimens from year to year are placed on exhibition at the annual poultry shows by the breeders themselves, or are sold to other breeders for exhibition purposes. At these poultry shows (some 300 or more of which are held every winter in the leading cities of the country, in addition to hundreds of poultry departments that are run in connection with annual district, state or county fairs), so-called poultry judges, or men who are well versed in the standard requirements and who make a business of judging poultry either by comparing two or more birds together, or by the use of what is called the score card, judge the fowls on exhibition, and cash premiums or ribbons are given to the birds that come nearest to perfection, that is, to the standard requirements. Comparison judging, as it is called, is the popular method at the fall fairs, mainly from the fact that poultry at this season of the year is not in the pink of condition for exhibition purposes. The young stock is too young to be in full feather and the old stock is in the molt, that is, is shedding its old feathers and putting on the new plumage, with which to go into the winter season. On the other hand, from November 1 to February 15, the season of the winter poultry exhibitions, both the young and old fowls are in fine feather and show up to best advantage. At these winter shows the score card is generally used. We present herewith a form of score card provided by the American Poultry Association:

A. P. A. STANDARD.
SCORE CARD.

Specimen Scored Dec. 22, 189b.

For Reliable Poultry Farm.

Variety Light Brahma *Sex* Cockerel.

Entry No. —— *Ring No.* 723 *Weight* 10¼

SYMMETRY (Typical Shape)		½	BREAST	Shape	½
WEIGHT				Color	
CONDITION		¾	BODY and FLUFF	Shape	
COMB				Color	
EYES			WINGS	Shape	
Head	Shape			Color	1
	Color		TAIL	Shape	½
WATTLES AND EARLOBES	Shape			Color	
	Color		LEGS and TOES	Shape	½
NECK	Shape			Color	½
	Color	¾	CREST and BEARD	Shape	
BACK	Shape			Color	
	Color	¾	HARDNESS OF FEATHER		
			SCORE		94¼ 5¾

C. A. Emry, *Judge.*

This is a duplicate of an actual card made out for a particular bird belonging to the Reliable Incubator and Brooder Company, which scored 94¼ points, that is, in the estimation of Judge Emry, this specimen came within 5¾ points of perfection, which is represented by 100 points. The cuts show where the bird was defective, in his opinion, and to what extent. We thus give the average reader who is not posted on standard-bred poultry matters a general idea of how the score card is used, but we cannot go into detail within the scope of this book. Let us say, however, that these poultry exhibitions are of incalculable help in developing the poultry industry in all its branches, in that they create great interest and win an ever increasing number of new friends for fowls that are both useful and beautiful. Many people who have not given the subject careful and logical thought feel free to ridicule the beautiful in standard-bred poultry. They simply under-estimate the great value that beauty in fowls has been in attracting attention, creating interest and winning thereby new and lasting friends for poultry bred to a combined ideal—the acme of utility and beauty. Our poultry shows, together with the superior work now being done by poultry artists and the more recent use of photographic reproductions, showing choice specimens of different varieties exactly as they are in life, have done and are doing a great work in developing the poultry industry, and whoever depreciates any one of them simply either is not well posted or is not mentally qualified to deliver a sound opinion.

A Chief Secret of Success.

It will be readily understood by the intelligent reader that whoever among the breeders of standard poultry is able to produce specimens that come nearest to perfection, that is, to standard requirements, will be able to obtain for these best specimens high prices. The fact is that in England, where the standard-bred poultry business is older than in this country, and where the interest is even greater, poultry shows being held every week in the year, as high as $1,000 has been refused in a number of cases for extra choice and extra valuable specimens as breeders, while in this country as high as $100 is paid every season for extra choice specimens, and from $200 to as high as $300 has been refused from time to time for some particular bird with a proud record at a leading poultry show. These birds are valuable, not alone for their individual excellence and the record they have made, but also because they are the result, as a rule, of years of careful and systematic breeding and carry in their veins blood that is able to reproduce the excellent qualities or characteristics for which this individual bird is so highly prized.

Here, then, is one of the chief secrets of success in breeding standard poultry satisfactorily. In the beginning, so we are told by men who are posted in chicken lore, there existed only one kind of chicken, a black and red jungle fowl of uncertain origin. It is claimed that from this one kind or variety man has produced through selection and persistent matings, the one hundred or more distinct varieties of poultry now in existence. No doubt this is substantially true, for more than half the varieties of fowls now described in the American Standard of Perfection and bred in large numbers at the present time have been "created" within the lifetime of poultrymen now living, and even within the past twenty-five years a dozen or more of our poultry varieties have come into existence. For example, twenty-five years ago there were no Buff Cochins, Silver Laced Wyandottes, White Wyandottes, White Plymouth Rocks, Buff Plymouth Rocks, Buff Wyandottes or Buff Leghorns in this country. The majority of these varieties did not exist in the world. New varieties are being created from time to time, some claim too numerously, others think not. Regardless of which is right, the constant aim may be said to be improvement either in utility or beauty, or both, and the goal sought at all times in the breeding of every variety is greater excellence, and the man or woman who is able to "mix the paints" and use "an eye for outline" to the best advantage is certain to win a golden reward, for the competition is keen and there is a widespread and constantly growing desire to "own the best." Frankly, more than average intelligence and enterprise are required in order to produce extra choice standard specimens. It has been said that "any fool can set a hen, but it takes brains to produce thoroughbred poultry." This remark is more true than elegant, but in all walks of life it is the same. The richer the reward the greater the effort required to obtain it.

Inasmuch as it has taken years to create the different varieties of standard-bred poultry, building them up to such

THE POULTRYMAN'S CHART.

The above Chart shows the sectional parts of a fowl: 1, Comb; 2, Face; 3, Wattles; 4, Earlobes; 5, Hackle; 6, Breast; 7, Back; 8, Saddle, 9, Saddle Feathers; 10, Sickles; 11, Tail Coverts; 12, Main Tail Feathers; 13, Wingbow; 14, Wing Coverts, forming Wing Bar; 15, Secondaries. Wing Bay; 16, Primaries or Flight Feathers, Wing Butts; 17, Point of Breast Bone; 18, Thighs; 19, Hocks; 20, Shanks or Legs; 21, Spurs; 22, Toes or Claws.

an extent that they will reproduce the desirable qualities and characteristics, it follows that the one way to preserve and augment these qualities and characteristics is to buy into a strain and stick to that strain for better or for worse. A common mistake made by persons who go into the standard-bred poultry business is to buy a few hens or pullets here, a cockerel there, some eggs from still another place, crossing and mixing the blood of different strains, regardless of the loss of the breeding lines on which these different strains have been developed. It is equivalent to throwing just that much money away, provided your aim is to make progress in breeding to standard requirements. The better way to do, the only sensible way to do, is to buy into some established strain, thus starting neck and neck with the breeder who created the strain. A beginner even in this case is at a disadvantage, but he stands a fair chance of success, and

progress is possible to him, where if he mixes the blood of two or more strains a set-back is almost certain to occur. There is a good deal to learn about poultry, especially the art of breeding to standard requirements with marked success.

Buy, therefore, with intelligence, not haphazardly, and it is the part of wisdom to decide on some breeder with an established reputation both as to the quality of his stock and his reliability as a man, then enlist his interest on your behalf, invite his advice as to what you should do the first few years, and take his advice until you are confident you know, of your own knowledge, what you should do. Do not be in a hurry to "go it alone." You will find sooner or later that men and women have grown old in the poultry business and still do not know it all. Be resolved, therefore, to be a good listener. Be patient, stick to it like grim death, and put into your work all the heart and all the brains at your command. Remember that some of the brightest men and women the Almighty has created in this generation are breeding standard poultry and doing their level best to show you a clean pair of heels. Remember that birds of your breeding, produced for exhibition purposes, must come into competition with those produced by men who have had

A Trio of Indian Runner Ducks.

This cut, reproduced from a photograph, shows a trio of brown and white Indian Runner Ducks, as bred by Mr. A. J. Hallock. One of these ducks laid 136 eggs in 142 days. They are the Leghorns of the duck family.

years of experience, by men of bright intellect, men of unlimited capital, men who breed to win and because they love the beautiful and excellent in fowls, not alone because of the money value in them. There is a sportsman side to this branch of the business that is legitimate and fascinating. While there is not much danger of any leading branch of the poultry business being overdone for many years to come, we believe we are safe in saying that the only branch of it which cannot and never will be overdone is that of producing standard specimens. Perfection is no doubt unattainable, but it will be sought to the end, and the men and women who are able to produce fowls approaching nearest to perfection will be well rewarded.

The writer is personally acquainted with a number of men who have made the breeding of standard poultry their life work. By this we mean that these men have never been in any other business. They started in the poultry business at fifteen to twenty years old, and have continued in it to date. Some of them have been in the business from fifteen to twenty-five years and we are well acquainted with the facts of their success. Mr. A. C. Hawkins, for example, has been in the standard poultry business twenty-six years and his annual sales of stock and eggs sold for exhibition and breeding purposes amount to from $18,000 to $20,000, and have for seven to nine years past. We know of other men whose annual sales run from $5,000 to $15,000, and we are personally acquainted with women who raise and sell from $1,000 to $3,000 worth of standard-bred stock and eggs each year, making a good living therefrom. In fact, in all these cases poultry as bred by these experienced persons is the best farm crop raised in their respective neighborhoods. Hundreds of men are making standard-bred poultry a side issue and clearing up each year snug sums ranging from two or three hundred dollars to two or three thousand dollars. We make these statements on the basis of our personal knowledge. The writer during the past eight years has traveled probably 50,000 miles, visiting poultrymen and attending poultry exhibitions, and this book is based on the best information thus obtained.

Poultry and Eggs for Market.

Probably four out of every five persons who think seriously of embarking in the poultry business approach it from what may be called the practical or market side. Their first idea is to raise hundreds of thousands of chickens for the common market, and we regret to say that as a rule they do not look carefully enough into the subject before investing their capital, and as a direct result many failures are recorded. We know of no business wherein a man who is apt with figures and given to figuring can make untold wealth easier or quicker than in producing poultry for market—on paper. We remember that the first time we got the fever it took one side of a sixteen-foot board for us to figure out the profits we were to make from a broiler plant that was to have a capacity of 8,000 broilers per season. We were not daft—simply figuring.

There is money in poultry for market, we would almost say plenty of it, but it depends on the man. It was Napoleon who said: "Men are nothing; a man is everything." This is true in the poultry business as well as in war or statesmanship. Take, for example, the experience of C. H. Wyckoff. We refer the reader to the chapter in this book entitled "Profitable Egg Farming." The writer visited Mr. Wyckoff's place, got his story from him direct, and it may be relied on. Mr. Wyckoff is a man in whom we have full confidence. He does not consider that he performed a miracle. He simply marked out his course, hewed closely to the line, was patient, and the results were entirely satisfactory. As further evidence of what can be done, special attention is directed to the chapter in this book entitled "Five Thousand Ducks Raised on Two Acres." Several other illustrations of what can be done, each and every one of them based on facts, will be found in this book, and we could add largely to their number if space permitted. These, let it be understood, are exceptional cases so far as success is concerned, but the men who achieved these successes are not extraordinary men. They are simply good American citizens who meant business and attended carefully to their own knitting. They are firm believers in the two old sayings, "What is worth doing at all is worth doing well," and "If you would be well served, serve yourself." Numerous other poultrymen have done and are doing equally as well.

To all those who contemplate raising poultry and eggs for market, let us say that a good market is of first importance. You should know what market you are to supply and what that market demands before you spend a dollar or take the first step toward going into the business. What you will want to do is to get into a position to furnish exactly what your market demands, what it prizes most highly

and will pay a premium on. Desirable goods always sell the easiest, and you will want to join with your market-men in catering to this invariable rule. A great secret of success is to send to market just what the market wants, delivering it there in the most attractive form possible, so as to attract favorable attention and command the highest prices. Not one poultryman in twenty gives particular attention to this important matter, but this simply means that the opportunity is all the greater for the twentieth one who has the good judgment to do so. As illustrating this point, we direct the reader's attention to the plan followed successfully by the Crescent Poultry Farm, of Kent, Ohio, in serving a fancy grocery house at Cleveland. A premium of five cents per dozen on strictly fresh eggs is all profit, and a premium of three to five cents per pound on neatly dressed fowls that are uniform in shape, color and size, is also practically clear profit. Inasmuch as this clear profit amounts from 10 to 20 per cent of the gross receipts, here alone is margin enough to make a success of the business when rightly conducted. Permit us to emphasize the fact in the mind of the reader that these pointers can be made to be worth hundreds of dollars to him if he will but heed them.

Beware of Worthless Advice.

We want to inject a word of warning just here. Nearly every man you meet has been, is, or wants to be a poultry crank! He either has had, has now, or will have sometime in his life what is called the "chicken fever." The point is this: Everyone of these men believes he has a plan in his head out of which he can make big money in the poultry business. The milk of human kindness is so plentiful that each one of these men is willing to try his plan on some friend or neighbor. We want to advise the reader in all seriousness against being that "friend or neighbor." You really cannot afford it. In ninety-nine cases out of a hundred these well-meaning men do not know east from west in the poultry business. Their knowledge consists of 75 per cent of hope and enthusiasm and 25 per cent of what they have read, seen and heard here, there and everywhere. These men are dangerous advisers—look out for them.

A Montana woman came 1,300 miles to consult the writer about embarking in the business of producing eggs for market. We said to her, "Madam, write out a check for $25, inclose it in a letter of inquiry to Mr. ——— and ask him to kindly write out for you in black and white a full account of his fifteen years' experience in this line of work, stating in full the mistakes made by him, what they cost him, how he overcame every obstacle, what measure of success he has met with, etc., etc. When he writes you all about it, advising you, as he will, just how in his opinion you should proceed, make up your mind once for all to follow his advice closely, disregarding anything and everything any one else tells you. Beware of the man who has a plan but who has never had any actual experience. Above all things distrust your own pet schemes and ideas, based as they are on theory and lead pencil work rather than on actual experience. Do this, stick to it wet or dry, hot or cold, and you should be able to succeed. Pay precious little attention to what interested friends tell you and steer clear of the worthless poultry paper. Fully 75 per cent of the stuff that is printed in various poultry papers and in the poultry departments of the average agricultural paper is clear guess work. It is not only valueless, but dangerous, for the man or woman who does not know any better, may accept and follow bad advice just as eagerly as pure gospel, but the outcome will be very different. Above all things, you want the best that money will buy in the shape of advice, and really valuable advice generally costs something. That which we get for nothing is too often worth no more than it costs.

Pure-Bred or Mongrel Stock?

No man is justified in handling mongrel poultry—not in this day and age of the world. It is the same with poultry as with horses, or cattle, or sheep or hogs—the most money is to be made in producing thorough-bred or standard-bred stock. It takes no more house room or yard room, no more feed, no more time and labor to raise 100 or 1,000 pure blood fowls than it does to raise an equal number of mongrels, but the value of the product in one case ranges from twice to several times as much as in the other, according to your skill as a breeder, and the market you reach.

In this day of over-production (so-called), what is wanted in many lines of effort is quality, not quantity alone. We have too much quantity and not enough quality. There is a premium in every market on quality, and that premium is nine-tenths profit. When asked by the inexperienced, "Which will pay me best, breeding thoroughbred poultry or raising poultry for market?" we invariably answer, "Unite the two." If you are a farmer or villager and have

Fancy-Bred, Full-Feathered Buff Cochin Cock.

mongrel stock, make up your mind to work into pure-bred stock as soon as you can, without unwise haste or expense. If you have no stock at all, decide upon some plan of securing pure-bred stock. It may be wise for you to get some mongrels to help make your start in the business, but by all means lay your plans with a view to handling nothing but pure-bred stock at the earliest date consistent with your capital and opportunities.

In this connection we reproduce a conclusive article from Farm-Poultry, written by the editor, Mr. A. F. Hunter, now associate editor of the Reliable Poultry Journal:

Silver Wyandottes vs. "Dung-hill Soupers."

"Armour & Co. are killing and dressing three thousand to six thousand head of chickens a day; it would pay you to see their place; you would get some interesting facts," wrote Mr. Hawk, of Kansas City, when we were considering the advisability of a trip west this winter. A few days later, while turning over the pages of the Midland Poultry Journal (of Kansas City), we came upon an advertisement of Messrs. Armour & Co., urging farmers to get thoroughbred Wyandotte, Plymouth Rock or Indian Game males to improve the quality of their poultry. 'That certainly is unique,' we thought. 'There is a meaning to that, if we could only get at it. Business men are not as a rule, paying advertising bills without there being reasonable grounds for expecting returns in the shape of profits.'

"That advertised advice was a puzzle, and the solution of the puzzle was one of the first things we asked for when we stepped off the train at Kansas City, and found Mr. Hawk awaiting us. It is a simple story. Armour & Co., have added poultry dressing and shipping to their beef, mutton and pork packing and shipping. One day last fall there came to the slaughter house, among a great many other coops of chickens, several coops containing "culls" from a farm where are kept Wyandottes only. Instructions were given to have that lot kept together and by themselves, so that they might be compared with the common "dung-hills," of which the bulk of the receipts consisted. When dressed and arranged for comparison, it was easy to see that the pure-bred Wyandottes were far superior in plumpness, fullness of breast, smooth fair skin, yellow legs—in fact, that it was a far better average lot of dressed poultry than the common stock. Mr. Armour's attention was called to the display, and he instructed the foreman in that department to pack five cases, of one hundred pounds each, ship one of them to each of five commission houses at different points in the east, and hand him a special report of the returns—also reporting prices returned on common chickens sent to the same places the same day. When the returns came in it was found that the five cases of Wyandottes were graded as "A No. 1", and the price was three cents a pound more than for the common chickens.

"What an object lesson!

"Armour & Co. are killing three thousand to six thousand head a day—six to ten tons. Calling it an average of eight tons, three cents more a pound makes a difference of $480 a day—$144,000 a year! Is it any wonder that they urge farmers to improve the quality of their stock?

If it is worth the while of Armour & Co. to pay advertising rates to get that advice before the farmers, how much more is it worth to the farmers to heed that advice, and improve the quality of their stock! The bulk of that additional $144,000 a year goes into the pockets of the farmers. It is only their commission, a small per cent for killing, dressing, packing and shipping, that Armour & Co. get. If Armour & Co. get but eight cents a pound for the common stuff, they can pay the farmers but six and a half or seven cents a pound for it; while if they get eleven cents a pound for the "A No. 1" lot they can pay the farmers nine and a half or ten cents for it. It costs as much and takes as long to kill and pick a scrub as it does a pure-bred—and the expense of handling, (dressing, packing and shipping) is the same. If Armour & Co. get three cents a pound more for the good stuff, they get their commission on a third more returns; but the farmer gets the full third more. It costs him no more to hatch and raise good stock than it does to hatch and raise scrubs, and he will get three cents (probably thirty-three and a third per cent) more a pound for it.

"The point would be better understoood if one could walk through the cold storage room, where there are about 300,000 pounds (a hundred and fifty tons!) of dressed poultry and game, the good stuff carefully wrapped in paper and packed in boxes ready for shipping. Each box has stenciled on it the kind and quality of the contents; as, for example, "forty broiler chicks, one and one-half pounds;" "thirty roaster chicks, three and one-half pounds;" "twenty-five fowls, four pounds;" etc. In one corner was a car load of lean skinny, things piled up. "What are those?" we asked. "Those are soupers. Three or four cents a pound for those," said our guide. Now it costs as much to coop and send those lean "soupers" as it did to coop and ship the "A No. 1" Wyandottes—and it takes just as long to dress, pack and ship them. The farmer gets almost nothing for the "soupers" he sends in, and Armour & Co. get hardly enough for them to pay for handling. After seeing the great pile of "dung-hill soupers" we could well understand why Armour & Co. advise farmers to improve their stock!"

So much for the advantages in thoroughbred stock when sold on the market. But the cream of the profits in the poultry business may be said to lie in selling standard-bred stock as standard-bred stock to the many persons who want it and who willingly pay from twice to twenty times as much for high-class poultry as can be obtained in any market at any season of the year for what is called common poultry.

It is truly remarkable what a widespread liking for fine poultry exists among mankind. It is confined to no one class. Merchants, professional men, bankers and retired capitalists have this common fondness for poultry, as well as the farmer, the mechanic and the day laborer. Many thousands of people who do not "keep chickens" find themselves wishing each winter and spring that they had "just a few hens." Fresh eggs are "a joy forever."

Another remarkable thing is the great demand for standard-bred poultry. Persons who do not read poultry journals and have not looked into the subject can have no idea of this demand, or of the hundreds of thousands of dollars that exchange hands every year in payment for high-class, standard-bred poultry—the prices ranging from $1 to $100 per head. It is no longer a surprising thing for a single fowl to sell for $50—in fact, 94-point Barred Plymouth Rocks can be sold by contract at that figure. To-day intelligently scored 90-point Barred Plymouth Rock male birds, ten months old, are worth $5 each in hundred lots, and the demand for such specimens far exceeds the supply. Every year many thousands of dollars are sent from the great west, the northwest, the south, and from the far-away Pacific Slope to the New England and Atlantic states for standard-bred poultry. Twenty-five dollars for a trio of fowls—(a male and two females) has come to be an ordinary price.

The great Mississippi Basin (the 500,000 square miles of territory drained by the Father of Waters and its tributaries) has now fairly wakened to the importance of poultry culture and in the years to come we are sure that many of the most noted and successful poultrymen of the world will be located between the Alleghanies and the Rockies, and the big sums of money that are now sent "down east" will be kept at home, and the chicken money from west of the Rockies will be stopped half way across the continent. The mid-continental states to-day have many capable breeders who are producing fowls second to none in the country and who are establishing reputations to that effect. In this section are now located numerous poultry farms and poultry plants that are doing very well indeed.

Getting Started in the Business.

Getting started in the fancy or standard-bred poultry business is a comparatively easy matter. This is so mainly because so many people are interested in and fond of good poultry. To every person starting in this branch of the poultry business, his or her poultry yard should be the center of the universe. The next door neighbors will be the first customers. Friends and acquaintances will come to see the standard-bred flock; they will admire them and buy eggs. Be careful not to sell too many eggs while your flock is small, for you will find it profitable to raise as many chicks yourself as possible. Raise 150 or 200 the first year from an average pen if you can, and you should have from $100 to $300 out of your first year's work, the amount of profit depending on the breed you select and the quality of fowls you buy.

Your first house should cost you very little. It is seldom that a shed, or part of a shed, or one corner of a barn, can not be spared for a pen of fowls. Partition off a section ten feet square; put an ordinary window in the south or east side; line the inside walls with folded newspapers; whitewash thoroughly; put up roosts and nests; see that the floor (a dirt floor preferred) is thoroughly dry, and the problem of a suitable home for the first flock is solved. The expense is small. We have known several persons to invest $50 in standard-bred poultry and make the first year from $200 to $450, nothing being deducted for feed or labor. On the farm the feed is not missed. Where all the feed has to be bought, one dollar will keep each fowl one year. As for the labor, less than two hours a day is required on an average to care for the fowls, old and young.

There are two especially good places in this world to raise poultry—in a barnyard and around a kitchen door.

The first pen of birds can be kept, almost, on the scraps that come from the average kitchen. If the owner keeps a horse, or a horse and cow, the fowls will thrive around the barn and kitchen at small expense for food.

The first year a small advertisement inserted in a local newspaper, or in a near-by poultry paper, will enable you to dispose of your surplus stock. You will want to keep your old birds for two more years' breeding, and also one or two pens of the best of the young stock, as you will wish to enlarge your business from year to year.

By following the simple and easy plan here briefly outlined, any person of intelligence and industry can get a start in poultry culture that can be developed into a business that will pay from $1,000 to $5,000 a year.

We maintain that the standard-bred poultry business is only getting fairly started, for the reason that more than ninety out of every one hundred flocks of poultry in this broad country are mongrel stock. This will not be so, just so sure as poultry keepers once discover the actual advantages in raising none but pure-bred fowls. In nine cases out of ten the farmer much prefers pure-bred fowls, and he will buy them if an opportunity offers itself and the prices are low enough. As an example of this, let some farmer or farmer's wife or son or daughter, living in any neighborhood, become interested in standard-bred fowls and send to some breeder for stock or eggs. As soon as a handsome flock is produced the neighbors show a keen interest and begin to buy. First, 50 cents a sitting is charged for eggs, then 75 cents, and finally $1 or more, as the demand increases. One dollar, and then $1.50, and finally $2 is charged for "roosters." That is the way it goes until some one breed of pure-bred chickens (Barred Plymouth Rocks, or Light Brahmas, or Brown Leghorns, for example) is found on a dozen or twenty farms in the one neighborhood. And the person who "keeps up" his stock by adding new blood each season, and who puts thought and care into his work, will be drawn on each year for "new blood" to help out his neighbors. In this way a regular and paying business is soon built up, a business that may be greatly extended by a person who has a business mind and is adapted to poultry raising.

In Behalf of High-Class, Pure-Bred Fowls.

To-day hundreds of men and women of widely different ages are breeding standard-bred poultry for profit. It is a pleasure always, and it should be profitable in every case, providing only that those who embark in the business start right and then display a proper amount of good sense and diligence.

By starting right we mean that, at the beginning, the dime of investment should not be held so close to the eye that the dollar of profit just beyond cannot be seen.

Let us illustrate: The writer himself remembers well of writing to a veteran breeder of Light Brahmas, for two pens of high-grade breeders. We did not ask him how cheap a pen we could get, but what two high-scoring pens of six birds each would cost. He replied, $100, providing we took the two pens. We did so. We have never regretted that purchase. We have the breeder and good common sense to thank for getting a right start.

But to continue the illustration. Those twelve birds cost us $100. That looked like an outlandish sum to pay for a dozen "chickens." Our acquaintances all thought so, and not a few of them said so. But we were conceited enough to think that we knew what we were about. This is how we reasoned: "One hundred dollars is a good deal to pay for twelve fowls, but these birds are among the finest that long years of careful breeding have been able to produce. By paying this sum I get the cream of all those years of study and work. I expect to raise the first year three hundred young birds from these two pens. Every one of these three hundred young chicks will have in its veins the royal blood of its parents, and on its plumage will be stamped indelibly the evidence of its proud pedigree. At the end of the first year I will have, not twelve birds, but three hundred and twelve, and instead of being ordinary stock, the whole number will be choice to extra choice—the legitimate result of long years of systematic breeding. It will cost me no more to raise the three hundred fine birds than it would to raise three hundred of the veriest scrubs, but what a difference in the results!"

We were not disappointed. We sold a few eggs from those old birds at $4 per thirteen and got as high as $10 each for some of the young cockerels. The first season's young stock paid for the old birds three times over and left us thirty fine breeders in addition to the first eleven—one hen had died. When we bought the old birds they were pullets and yearling cocks. The cocks we used three years as breeders and the pullets four.

This gives the reader a glimpse into the profitableness of that first purchase of ours. We were fortunate enough to get started right, and as a result we are in the business to-day on a scale that was not dreamed of when we wrote our first inquiry for stock. One hundred dollars was a big sum to put into twelve birds, but when this amount was distributed over the large number of fine birds we raised from them, the $100 dwindled down to a few cents per head and we reaped a harvest.

We have made public this much of our private experience because we know that it contains a valuable lesson for the scores of others who stand to-day where we stood at the beginning. We wish to have them profit by our experience. As long as fully 90 per cent of the poultry in this country is of the dung-hill, mongrel variety, there is no fear of overdoing the business of raising and introducing pure-bred fowls.

Finally, a man can be a man in the poultry business. The earth is beneath his feet, the open sky above his head. He can find a market anywhere for his produce, and need ask odds of no man. But by all means let him move forward cautiously. Let him "begin at the beginning" and not expect to accomplish wonders in a fortnight. If there were no drawbacks to the business of poultry-raising, if there were no obstacles to overcome, if there were no disappointments in store for you—if all were smooth sailing, with a fat purse for your compass, there would be no money in the business, none whatever, for in that case every thoughtless, wreckless, shiftless Tom, Dick and Harry who tried it would succeed and there would be nothing left as a reward for earnest effort, careful methods, and perseverance.

Editor.

LEADING STANDARD BREEDS.

Articles on the Best and Most Popular Varieties of Poultry in Existence, by Expert Specialty Breeders—These Articles Not Only Set Forth the Characteristics of Each, but also Give Valuable Inside Information on Mating for Best Results—Do Not "Trust to Luck"—Follow Good Advice.

ARTICLES under this chapter are alone worth one hundred dollars of any person's money who is really interested in poultry for pleasure or profit, or both. We say this mainly to emphasize the high character of these special articles. After a person has about made up his mind to engage in the poultry business, the question naturally arises, "With what breed or variety shall I begin?" What better answer could we furnish than the following descriptive, illustrated articles by noted breeders each of whom makes a specialty of the variety he writes about? These breeders are noted, not alone for the fine fowls they produce, but also for their integrity as business men.

Permit us a few words of caution to the beginner: It is really better for you to start out with one variety, rather than with two or more. Learn thoroughly the one variety before you take up another. If your location is good, and you have the capital and enterprise, we see no real objection to the adoption of other varieties or breeds, but be sure that you are an expert with each variety you carry before taking up a new one.

Unlike Alexander the Great, you will not sit down and weep for more worlds to conquer—not if you go into the poultry business with a determination to surpass all others. You will find plenty of big, brainy, whole-souled men and women engaged in poultry culture. To succeed to a high degree in such company is no boy's job. One of the first things you will be impressed and delighted with, is the strong, helpful fraternal spirit existing among poultrymen.

You will find in the business many a good man and woman who will treat you more than fairly, and who will be to you a source of much encouragement.

BARRED PLYMOUTH ROCKS.

A Clean-cut and Comprehensive Descriptive Article on America's Best Production in Poultry by a Breeder Qualified to Speak Authoritatively.

BY MR. E. B. THOMPSON, BREEDER.

The Barred Plymouth Rock has been termed America's idol. There is no other variety, the product of American skill in breeding, that we can put on the markets of the world with so much pride, and none other is received from our shores by foreign fanciers with so much favor. They need no booming. They stand acknowledged without an equal as the best general-purpose fowl bred. They thrive anywhere, and are rapid growers, and make plump, juicy broilers at eight to twelve weeks old. As a market fowl they have no successful rivals among the pure breeds. They are a great favorite with farmers and market poultrymen, who breed this variety more extensively than all other pure breeds combined. As a fancier's fowl, the Plymouth Rock has reached a popularity in this country never before known. Utility and actual worth are the basis of this popularity, and make the Barred Plymouth Rock the bird of destiny, a breed come to stay.

There are many valuable breeds of poultry among our standard varieties. Some excel in beauty of plumage and graceful forms; others in massive size and majestic carriage, while still other breeds court popular favor by their records as egg producers. Nearly all breeds combine some of the good qualities in some degree. Bantams are handsome and good layers of eggs proportionate to the size of the breed. The smaller a bantam can be bred the better. They have hosts of admirers, and as pets and a breed upon which to exercise a true fancier's skill, they are valuable.

The ornamental breeds are small in size. and fanciers of such do not find their ideal fowls in a large variety—a Cochin, Langshan or Brahma—while fanciers of these massive birds can not see their ideal in a small fowl, be it gorgeous in feathers and as graceful in movement as a billowy cloud. We are speaking of fanciers in general. There doubtless are some who really love several breeds, both great and small, handsome and plain; but the majority find their hearts' idol in some particular variety although they may breed several varieties.

For a person who wants a business fowl, one that never deserts its post nor shirks a duty, I believe the Barred Plymouth Rock fills the bill nearer than any other breed, They are always ready for business, rain or shine. They are medium in size, and if decently fed are always in good, meaty condition to kill after eight weeks old. Their early maturity adapts them especially for broiler use.

The Plymouth Rocks are excellent "all the year round" layers, and will lay as many eggs as any breed that incubates and rears its young. They are the farmers' favorite. In the smaller breeds we may get better layers, but lose size. The larger breeds give us no more, if as many eggs as the Plymouth Rocks, are later maturing and lack the sprightliness and elasticity of movement so admired in a medium large fowl.

The Barred Plymouth Rock is nearly always the largest class at our American shows, and strictly choice specimens command a higher price than any other American breed, which prove their sterling merits. New breeds come and go, but the great qualities of the Barred Plymouth Rock become more and more indelible. As a practical fowl, suited to the wants and conditions of those who desire eggs, meat and feathers combined in one breed, they acknowledge no competition.

Mating Barred Plymouth Rocks a Study.

The mating of Barred Plymouth Rocks to produce exhibition specimens is a study indeed. My opinion is, that as a rule the finest show cockerels are the result of the

mating of a standard colored male with medium to medium dark females having deep barring even and straight across. The black bars in cockerels should be avoided, and in standard color the light bars should be clear and free from muddiness.

The best pullets come from prime colored hens and a male lighter color than a show bird.

Ancestral backing must be considered in mating Plymouth Rocks. The cockerel used for a pullet mating should be one whose dam was a prime high-scoring hen. Such a male will get far finer pullets than one equal in individual quality but bred from an ordinary hen. The same is true in a cockerel mating. Only males should be used as breeders that are first-class and sired by first-class cockerels, the finer the cockerel the better.

Chance birds are of little used as breeders, because they will not transmit their good points or reproduce themselves in their progeny. Some fine chicks, both cockerels and pullets, can be bred from what is called the "single mating"—standard or exhibition colored females and a standard colored male.

The blue tinge to the plumage should be always kept in mind, for this is one of the main attractions of the breed from a fancier's standpoint. To preserve even this, however, a regular barring of the feathers should not be sacrificed. A crescent bar is not what is wanted, but straight, distinct lines running well to the skin; and if the feathers are rightly placed the "ringlets" or "zebra stripes" will be clearly defined throughout the whole body. These add to the beauty of a Plymouth Rock, and are much sought after by breeders of America's favorite fowl. It has been stated that some breeders are sacrificing regular parallel barring—which on feathers evenly placed show the ringlets—to get light surface color in females, which practice, if carried to extremes, is wholly wrong. All the fine features in color and plumage should, as far as possible, be preserved, and no one point be rejected to bring out another. The aim should be a harmonious whole to comply with the written rules of the American Standard. A perfect individual feather of the Barred Plymouth Rock is worth the study of an artist, and shows the beautiful in nature to a high degree.

While the plumage of a Barred Plymouth Rock, taken as a whole, would not rank as gorgeous, they have an everyday prosperous, well-to-do, business-like dress and appearance, which, with their size, carriage and well-rounded form, make them a handsome fowl and adapted alike to the wants of the marketman and farmer, or poultry fancier, and in breeding fine exhibition specimens the fancier can find in the Barred Plymouth Rocks a wide and boundless field in which to display his greatest skill and genius.

Cleanliness is one of the first essentials to success with poultry; not only must they have clean quarters, but the fowls must be kept free from vermin. Another essential is dry quarters, with perfect freedom from drafts during cold or wintry nights. Provide these, with enough range so that the fowls will be contented; furnish them with plenty of fresh, pure water; feed a good variety of sound, wholesome food, including green food in summer, cut vegetables in winter and cut green bone the year 'round—supply these and poultry will pay, and pay well.

HOW TO BREED EXHIBITION BARRED ROCKS.

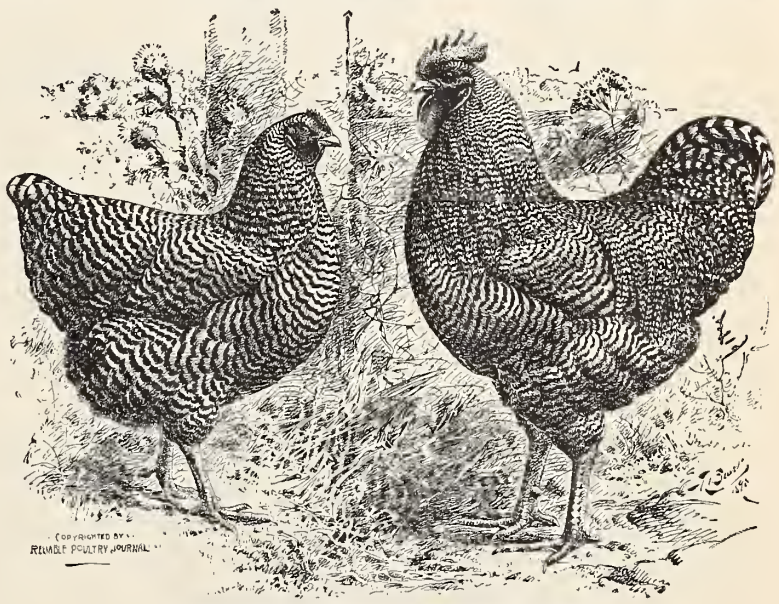
Detailed Instruction on Mating in Order to Produce Exhibition Males and Females—The Double Mating System Advised.

BY MR. A. C. HAWKINS, JUDGE AND BREEDER.

NO PROBLEM has been more difficult to solve by the American fanciers than that of breeding high-class exhibition Barred Plymouth Rocks. The material that was used in producing this breed at the beginning was such that the different sexes have tended to follow in line from the first.

The Dominique male was mated with the Black Java female, and the produce from the union was the original Barred Plymouth Rock. The pullets came dark in color, many of them black like the dam, while the males were light in color like the sire. The tendency is the same today in many flocks where the owners have tried to breed standard birds of both sexes from the same mating.

The leading breeders of this variety who have been most successful in producing high-scoring specimens have adopted the double mating system, that of making a special mating to produce exhibition males and another or different line to produce show females. It is of this method of special matings that I shall treat particularly, as I believe the most perfect specimens can be produced in this way. If the judges in different sections of the country did not differ so much in their ideal Barred Plymouth Rock, it would be much easier to understand what I mean by an exhibition specimen. I shall describe what I believe to be the ideal Barred Plymouth Rock.



Standard-bred Barred Plymouth Rocks.

Many of the judges have become so thoroughly carried away with the under barring that they pay little attention to the beauty of the surface color. They begin to score from the skin and cut more severely for lack of under-color than for an inferior surface. The beauty of a fowl is what we see, and while I am a believer in distinct, even barring under the surface, I do not want the bars so strong and heavy underneath that they destroy the beautiful blue on the surface, and it is a fact that most of the specimens that are very strong in under-color have a muddy black bar on the surface. It is also a fact that the very finest surface colored birds have not the strongest under-color. The two

qualities do not breed together, naturally, or, in other words, those males that are most attractive in the breeding yard and exhibition pen may not have the same strength in the under-barring as other specimens that are less attractive.

Now, breeders, which will you have? What I want, and what any real fancier wants, is perfection in surface color and all the under-barring that nature will supply with it, and not what some judges I know require, namely, perfection in under-barring and as good surface as we can get with it.

Line for Male Breeding.

To produce fine males select the very best exhibition male to head the pen. He must be a bird of standard weight, or a little over, with broad, full breast; low, evenly serrated comb; solid red lobes, bay eyes; broad, well curved back; nicely curved tail, carried rather low; and strong, rich yellow legs, set well apart. In color he should be a rich, dark blue, even all over. and as closely barred as possible to retain distinctness, with wings and tail distinctly barred throughout. Get all the under-color possible with such a surface, but do not let the surface suffer for the sake of heavy under-color.

Mate with this male eight or ten females of the same line of blood, or, in other words, females whose sire and grand-sire were high scoring exhibition males of the type and color I have described. Select females of standard size, with small, evenly serrated combs, bay eyes, blocky shape, broad backs, low, well-barred tails, and strong, yellow legs. In color these females should be several shades darker than exhibition color, the bars to be narrow, distinct and close together in all sections, with the under-color strong and distinct to the skin. With these strong colored females you can get all the under-color in the male product that it is possible to have with a brilliant, high colored surface.

From such a mating as I have described, if bred in line, I can produce 95 per cent first-class breeding males with 25 per cent of sufficient merit for exhibition at the best shows.

Line for Female Breeding.

In mating to produce high-class exhibition pullets select females of the best exhibition color, evenly and distinctly barred down to the skin. Be particular that the neck is evenly and closely barred and not lighter in color than the back and body. Have the main tail feathers and tail coverts well barred across the feather. Females are liable to fail in these sections unless care is exercised in the selection of the breeders. Have them standard weight or a little over, with broad, full breasts, broad backs, gently inclining to the tail, which should not be carried too high. I prefer a slight cushion, which gives the female a round, blocky appearance. The comb should be small and evenly serrated, eyes bay, and legs a rich yellow. Such a bird should be fit to show in any company. If these females have been bred in line for several generations the offspring will be more even in form and color.

With these females place a male of medium light color and of even shade from head to tail. He should be of standard weight, have broad, deep, full breast; body not too short; back well curved to tail, which should be carried rather low. This male should have been bred in line from high-class exhibition females for several generations, so that his blood may have the same character as that of the females with which he is mated.

From such a mating can be produced 95 per cent of first-class breeding females and 20 to 30 per cent of high scoring show specimens. The males from this mating will be very nearly the color of the sire, and are useful as breeding birds in mating for exhibition females. Save only those that are even in color for breeding purposes.

Care of the Breeding Pen.

While it is necessary to have the best blood and quality in the breeding pen to secure good results, there are many other conditions that are equally as important in the production of the winning show bird. The breeding fowls should have a large grass range during the breeding season, so that they may have perfect health and vigor, and that the eggs laid will contain strong germs produced from nature's food. The exercise, insects and green food which nature supplies have much to do with the vigor and development of the coming chicks. Give them nature from the beginning until they are ready for the show room and breeding pen. Hatch and raise them with hens, and give the chicks the opportunity to roam for insects as soon as they have the strength and desire to do so. Give them an abundance of fresh air and room in their roosting quarters. Deprive them of nothing that will add to their thrift and comfort, and when the birds get into strong competition in the show room you will be well paid for your extra care. They will have the size, the color, the form, the style and vigor, all of which should be combined in the winning show bird.

For twenty-five years I have bred the Barred Plymouth Rock, and have yet to find a fowl with more desirable qualities. Their great popularity has been earned by their real practical merit. Their beautiful form and color will always make them the ideal of the true fancier.

WHITE PLYMOUTH ROCKS.

An Article Descriptive of the White Plymouth Rocks, a Variety that Many Claim is "The Coming General Purpose Fowl." It Certainly Has No Superior

BY REV. JOHN HUGHES, BREEDER.

The White Plymouth Rock, said to be a descendant from sports of the Barred Plymouth Rock, must be of the same form and weight, pure white in plumage, and ought to be, and in my opinion is, possessed of all the excellencies of his justly popular ancestor.

The difference in standard requirements is in the color of plumage only. The Whites have the same yellow skin, beak and legs; the same bay eye and blocky build. They dress more neatly, showing no black pin-feathers when ready for the pot. Their meat is just as desirable for the table. They lay just as many eggs, mature as early, and breed to standard requirements more easily. There is no need of two matings, one for cockerels and one for pullets, with the inevitable lot of culls fit for the market only; no racking of brains with a lifetime's experience to attain "the blue tinge in color, which should always be kept in mind," with the feathers regularly barred with "straight, distinct lines, running well to the skin," that the "ringlets" or "zebra stripes" may be clearly defined throughout the whole body." "The mating of Barred Plymouth Rocks to produce exhibition specimens is a study indeed," and after all the thought and care bestowed on the subject the long sought for is not yet attained, for one of our judges says: "There is something wrong with the mating of Barred Plymouth Rocks or there would be more of them to be had when purchasers are willing to pay any price to get them that the breeder cares to name." Nor are the authorities agreed as to whether there shall be two matings or one. And then when you have a specimen that will score righteously ninety-three to ninety-four points you have attained the limit of perfection. We indeed see cockerels advertised

as scoring ninety-six points; but are there any such scores certified to by Theo. Hewes, B. N. Pierce, F. W. Hitchcock, F. H. Shellabarger, or any of our leading judges? The same care and skill will produce White Plymouth Rock cockerels at ninety-five and ninety-six honest points, and very few specimens at less than ninety points.

Right here I make the claim that intelligent breeders of the White variety can produce a much larger per cent of standard birds than many of the more popular varieties and, of course, with much less waste in culls. There is the handicap of solid color varieties, when in competition with the parti-colored, a confession of this point.

I would not be understood as inveighing against the Barred Rock. "I love not Caesar less, but Rome more." I have bred them and can sympathize with the enthusiasm of the fancier who has produced a really fine specimen. It is indeed an attainment, and well may his pulse quicken at his anticipated triumph in the show room. But why should the amateur fool away his time and get badly left in the end, when he can with a reasonable outlay of time, care and expense, with due exercise of brain, be successful and have more dollars in his pocket?

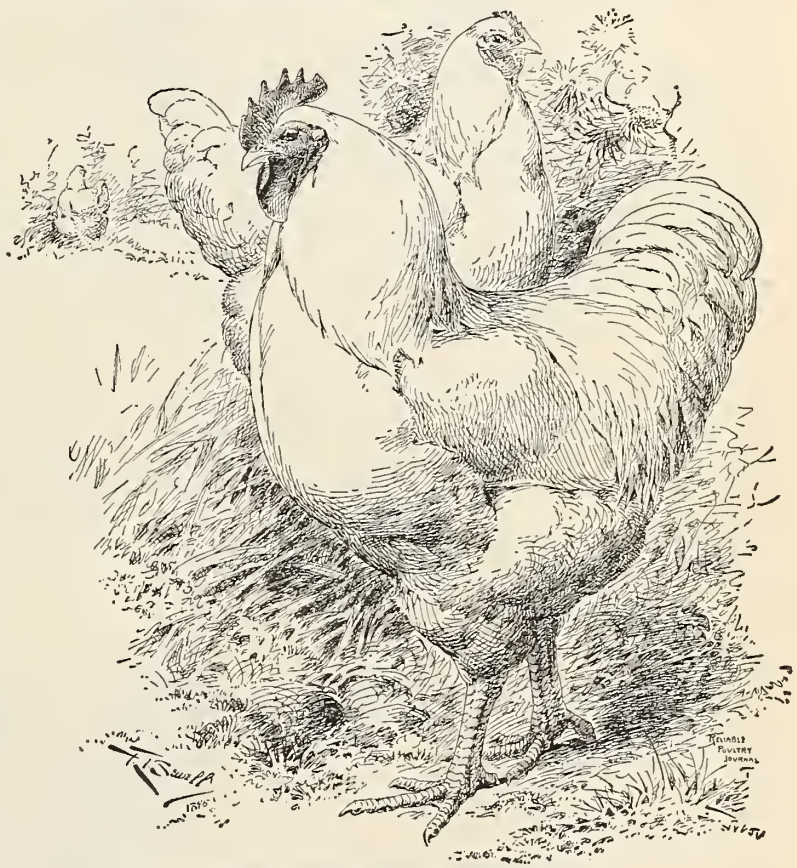
If the Barred Plymouth Rock is the farmers' fowl par excellence, so is the White as well, for the one has not one good quality not possessed by the other, and in some points the Whites excel. The Whites are just as good rangers and hustle equally well for a living, and when neglected will not run into a smutty unsightly plumage, nor if crossed throw a lot of black posterity. [But they do run, if neglected, to an unsightly yellow plumage, which is as undesirable as the smutty appearance in the Barred variety.—ED.]

Breeding the White Plymouth Rocks.

In breeding the White Plymouth Rocks use the best specimens only—those which show best in all required points. Remember that in breeding for pure white feathers only, you are in danger of losing the bay eye and yellow skin and legs; or in breeding for the deep yellow in required sections you are in danger of running to creamy colored feathers, and the despised "brassy color" on the surface. There seems to be a connection between the deep yellow in skin and the straw color on back and wings. My experience is that it is neither feed nor sunshine that produces that unsightly surface color, for I have known specimens to maintain the purest white in surface for years and be fed constantly on corn and continually exposed to the sun. Corn produces fat, and fat fowls molt yellowish feathers, but they come white with age. The brassy color will not fade out for me. Weed it out by breeding from cockerels that show none of it.

It should also be remembered that good care has very much to do in producing fine fowls. Do not over-feed, for this is the cause of one-half of the diseases, with lice perhaps the cause of the other half. An active, stirring bird is a healthy one, and should not be over fat. They should have feed enough to be in good flesh, otherwise they will deteriorate. The farmers say they like a hog crossed with the corncrib; and the finest stock in the world will become scrubs when exposed to all weather and half starved. Especially should young stock be kept thrifty and growing—and in no other way can fine birds be produced. And the purchaser should bear in mind if he starts with fine fowls or with eggs, that they are stock that have been used to high living and neglect will bring a penalty for which he only will be to blame. Many purchasers of eggs have been disappointed because the young White Plymouth Rock chicks were not hatched pure white, and they have thought they were imposed upon by that mottled group of yellow-white, blue and brown chicks. The writer has been roundly abused for that same group. But that is the way they all come, and the darkest chick will likely make the whitest fowl. The dark color is only a reminiscense of color in the Barred progenitors—and a little patient waiting will prove that all fanciers are not rascals, and that perhaps you have been a little hasty in your judgment.

I would urge that breeders of this variety direct their efforts to attain the highest excellence in it, so that our favorites, which we are so confident are second to none as an all-purpose fowl, shall come to the front and occupy the place they justly deserve.



Standard-bred White Plymouth Rocks.

WHITE WYANDOTTES.

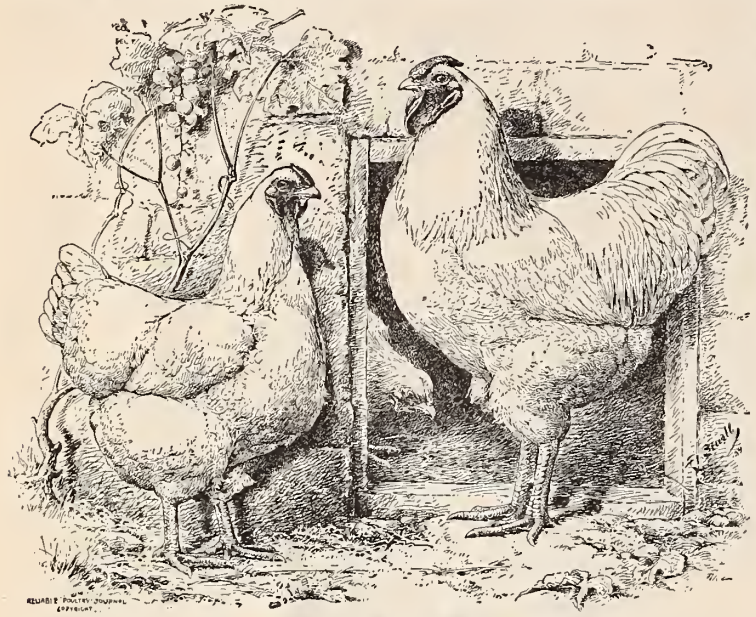
Rivals of the White Plymouth Rocks—They Grow in Popularity Very Rapidly—The Best Breeds for Broilers.

BY MR. A. G. DUSTON, BREEDER.

There is nothing I enjoy better than an opportunity to tell of the true merits of the White Wyandottes.

The story of this beautiful bird runs about as follows: We have first, a good sized egg of brown color, or richly tinted, and an egg that is hatchable, one well fertilized, being almost sure to hatch under any conditions, the shell being thin and easily broken. As chicks they are easily raised, and under artificial methods they will stand forcing better than any of the five other breeds that I have handled. Although active, they have a quiet disposition, so they

stand confinement well, thus insuring steady growth where a Mediterranean would "fly all to pieces." As pullets they are quick maturing, being a month earlier than any of the American classes, laying, with any decent care, when five to six months old. The males make splendid roasters with their bright yellow legs and plump breasts and are ready



Standard-bred White Wyandottes.

to kill at almost any time after four weeks. I know what I say is true, for I have sold hundreds that weighed only thirteen ounces alive and they were round as butter-balls. For broilers the White Wyandotte stands out unexcelled, making two pounds in eight weeks, and no dark pin-feathers to contend with.

The pullets commence to lay early, and are very regular. Having low rose combs they are never troubled by frost, and all winter will keep up the egg production, discounting any breed I ever had. I can show by my files that other persons have discarded the Leghorn on account of the laying qualities of the White Wyandottes, after running them side by side. When spring comes you do not have to scour the neighborhood for "sitting hens." While they become broody, all that have ever run them will testify to the ease with which they can be broken up. As mothers they are fine, having smooth legs and not being so heavy as to crush the life out of a chick should they happen to step on it.

As for beauty, who will deny it? Yesterday on one of my outlying farms I was looking over the young stock. In one flock were about two hundred birds, pullets and cockerels, and where could one find anything prettier. They were white as snow, with bright red combs and quick, wide-awake motions.

As a practical fowl I know them to be unsurpassed, for I made the test with my mind predisposed in favor of the Barred Plymouth Rocks, with a "little pot" invested in Light Brahmas, a bird I most sincerely admire to-day, with my eye full of the lordly Langshans, and delighted with the delicate color and soft plumage of the Buff Cochins, so you can judge it took a good practical bird to make me drop all for the White Wyandottes.

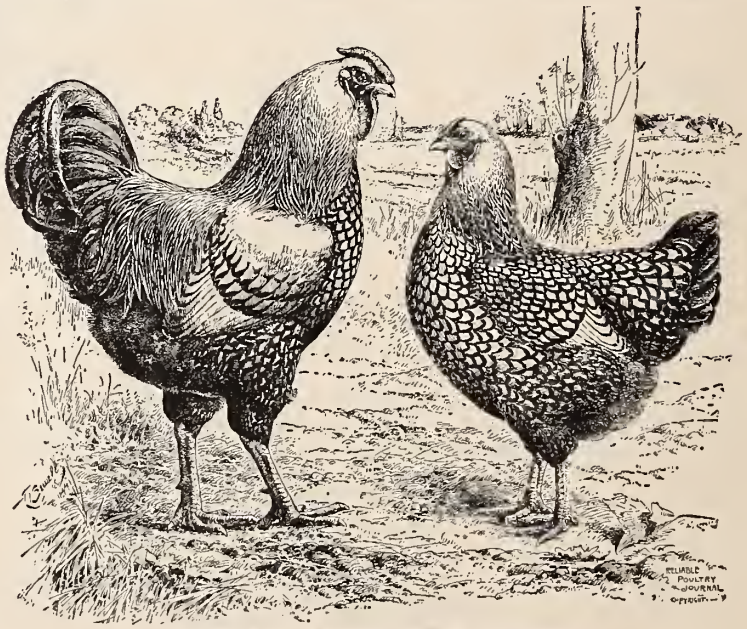
As regards breeding, in a general way one might say, strive always as far as possible to mate your birds so that any defect may be remedied by a strong point in the male overcoming the weak one in female, and vice versa. This sounds well, but does not always work, first, because the especially good point that we have worked so long and hard to attain is forgotten in the strife to better some other section. A good flock of White Wyandottes well mated is a gold mine, but like a gold mine it must be worked. If a man tries to raise chickens but spends all his time sitting around, I would not give fifteen cents apiece for the chicks he does raise, even if they were hatched from the best eggs ever laid. It takes work and lots of it to succeed with chickens, and while there is a good living in it and much keen enjoyment, if you have not the capacity to work hard, let it alone, and when you decide to enter these fraternal ranks do not fail to try White Wyandottes, for they stand out pre-eminently the bird of to-day, whose popularity is fostered by its combined practical and beauty points. As a good show specimen there is nothing handsomer in fowls to-day, and as a good market bird there is nothing better.

SILVER LACED WYANDOTTES.

A Breed Which Grows in Popularity—A Rival of the Barred Rocks as a General Purpose Fowl—They Make First-Class Broilers—Good Layers and Good Mothers.

BY MR. HENRY STEINMESCH, BREEDER.

The Silver Laced Wyandotte is a combination of beauty and utility, and in this respect is excelled by no other breed. They are hardy, and whether in the sunny south or the frigid north, the Green Mountain hills of Vermont, or the sandy soil of the Pacific coast, they grow and thrive, and



Standard-bred Silver Laced Wyandottes.

sing and lay, bringing pleasure and profit wherever they are.

The Silver Wyandotte is of medium size, the Standard calling for the following weights: Cock, eight and one-half pounds; hen, six and one-half pounds; cockerel, seven and one-half pounds; pullet, five and one-half pounds. One of the largest buyers and shippers of poultry in the St. Louis

market says these weights are the most desirable for adult fowls, and that poultry of that weight would always be assured of top prices in any market in this country. As spring chickens they are equally desirable. The chicks grow rapidly and feather out quickly, giving them a plump appearance. At eight to ten weeks they will weigh one and one-fourth to one and three-fourths pounds; that is they will dress at these weights, making the very best of broilers. Their meat is tender and juicy, and in this respect they surpass their only rivals, the Barred Rocks, for public favor.

As layers of eggs they are in the front rank. Their low rose comb and medium sized wattles enable them to stand the severe winter better than most breeds, and at the season of the year when eggs are bringing the highest prices they will lay more eggs than any other breed under the same conditions. They will get broody once or twice a year, but lose very little time that way. They are naturally quiet and gentle, but appear just a little more so when sitting. They make no fuss, break no eggs, desert no nests, but just go on attending strictly to business, and afterward rear their young in a sort of "That's-what-I'm-here-for" way.

Mating Silver Wyandottes.

The most interesting study in the poultry world is the mating of birds to produce certain results, and in no breed is this so much of a study as in the case of the Silver Wyandotte. When they were first brought forth for public favor we were satisfied with a Hamburg comb and narrow centers, but later on the call was for a distinct Wyandotte comb and for more open lacing. To produce such birds has required the experience and patience of the best breeders in this country, and it is extremely gratifying to know that at next winter's shows we shall see better Silver Wyandottes than have ever before been shown in this country.

In mating for open lacing it is of the utmost importance that the male bird be strong in that respect. The open lacing should show the white center, shaped something like an almond, but not quite so pointed. The black lacing should encircle the white entirely—the stronger the black, the better, as it will hold color, not fade in the "wash" (molt). He should not only be open laced in the breast, but should also show this same characteristic in his back and in his thighs clear up to the fluff, and the wing bar should be clear and distinct. The under-color of the bird should be slate or dark slate, as this is the color that will hold. Birds with white or cotton under-color generally go to pieces after the first molt, no matter how evenly and clearly laced as cockerels or pullets.

In selecting breeders it is desirable to have them with feathers free of mossy or frosty edging. This is a fault hard to control and care should be used not to mate such birds. We can never breed good Silver Wyandottes where this fault is predominant in both sexes.

It is very desirable to have birds with a clear, silver white hackle and saddle, properly laced, but such birds, with all other sections good, are rare, and we are disposed to be lenient where these sections are simply a little cloudy or smoky, but most severely condemn the bronze or copper color, or a streak of red or rust here or there. The tail must be solid black in the male, and as much so as possible in the female.

I would also advise that close attention be paid to the comb and eyes. The former should be of medium size, well serrated, and shaped closely to the head, coming to a spike point behind. A good Wyandotte comb is peculiar to itself and adds materially to the beauty of the breed. The eyes should be a bright bay. Pale blue or pearl eyes are quite common in this breed, but they can be bred out with good care, and we hope to see less of them in the future.

In conclusion, I should like to strongly recommend the use of only such breeders as are full standard weight. I do not mean birds so large that they are unshapely, but a male weighing seven to seven and one-half pounds, of square and blocky build, with a good broad breast and a broad back, with legs set well apart. The female should be trimly built, weighing five and one-half to six pounds. She should be full breasted and her back should be broad, with a slight cushion. Avoid, as far as possible, the narrow breasted, narrow backed, pinched tail, long legged birds. Such stock will breed nothing but disappointment. On the other hand, use birds such as are called for by the American Standard. Get the best, start in right, and your anticipations will come pretty near being realized, in my opinion, just a little more so with Silver Wyandottes than with any other breed.

LIGHT BRAHMAS.

A Grand Breed—Kind, Gentle, Productive, Profitable—Their Proper Shape, Color, Markings—Also How to Mate Them for Best Results.

BY MR. H. S. BABCOCK, JUDGE AND BREEDER,

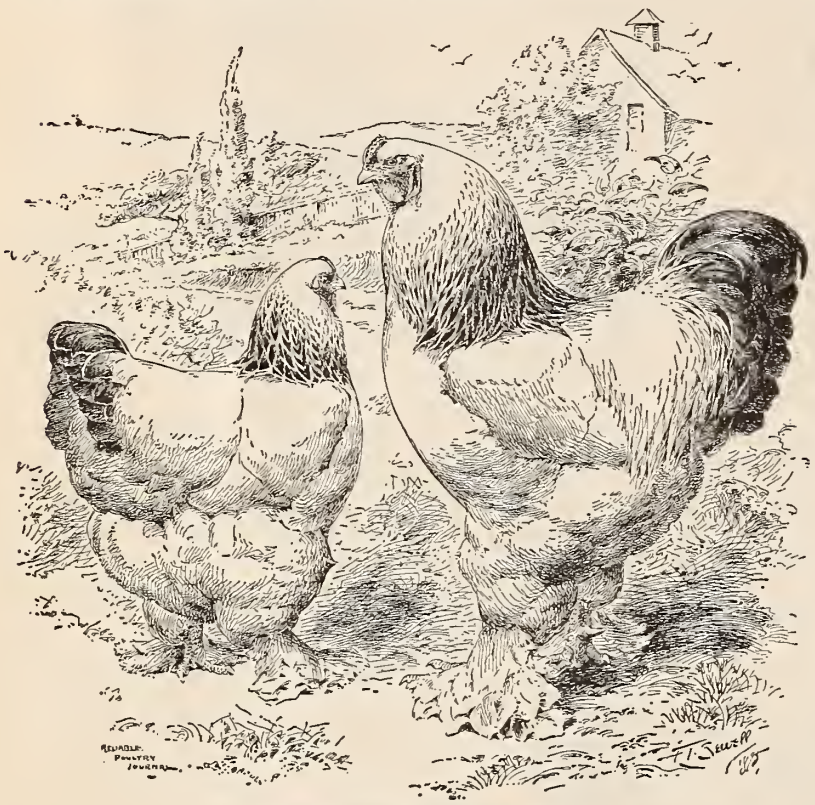
[Note—Where the Light Brahma is well known, we need say little in its behalf. The standard weight of the hen of this noble breed is nine and one-half pounds, while that of the cock is twelve pounds. Think of it! They weigh like turkeys. They are splendid table fowls, lay extra well in the winter time, do not suffer from severe cold, and for home use are unexcelled. We have handled no breed of poultry with a greater degree of satisfaction than the Light Brahmas. Out of one hundred Light Brahma chicks that come from choice stock, from eighty to ninety of them will make good birds. Herein lies one chief source of the profit in breeding Light Brahmas. Of this breed it may be said with reasonable assurance that "like produces like." One objection to the Light Brahmas, as compared with some of the smaller breeds, is their feathered legs, but owing to the marked vigor of the chicks this objection is not a serious one. There is a gentleness about the properly treated Light Brahma that wins the human heart. They respond to kind treatment with evident affection. Like many another breed they learn to know their friends and to trust them. They will learn to respond to a name like a dog. We had, some years ago, an especially responsive yearling hen named Rachel. She would come promptly when called by name, leaving the flock at the far end of the yard. We ornamented her with a blue ribbon and a silver bell tied 'round her neck, and seldom failed to parade her intelligence before visitors—Editor.]

The typical Light Brahma, from the American point of view, is a large fowl, with moderately abundant plumage, the feathers lying much closer than in the Cochin. In fact, along the back of the Light Brahma it is desirable that the feathers should lie so smoothly as to suggest a back cut out of white marble. The hock should be clean cut, showing clearly in profile with no suggestion of vulture hock, and the shank should be well feathered, and I like to see both outer and middle toes feathered to the nails.

The colors in this variety are milk-white and jet black, that is, the colors we desire to obtain are such, but we often fail in getting just what we want, for the white may, and, if skin and legs are a rich yellow, must have more or less tendency to yellow, and the black is either too abundant or too scarce and is sometimes smoky, almost brown. But when we get just what we wish in colors, and get them in the proper proportions and rightly distributed, we have a

most beautiful combination, and on a large, well-shaped bird a combination displayed so as to provoke admiration from almost every person.

The best colored pullets, and to some extent, though less so than with the pullets, the best colored cockerels, will show black in the web of the feathers of the back. These are the pullets and cockerels, however, that as hens and cocks, do the winning, and are the ones that the winners are bred from. To get them ready to show in the chicken classes these dark feathers should be plucked out six or eight weeks before the exhibition, so as to give time for new ones to grow. They will almost always come of the desired color. But if one does not care to do this, all he has to do is to let them alone, and when they molt they will be replaced by nice white feathers. The chickens that are white in the back



Standard-bred Light Brahmas.

are almost always faded in wings and tail and deficient in hackle when they are fowls, but these black-backed birds have the desired strongly colored wings, tails and hackles.

In mating for color it is indispensable that at least one of the sexes should have dark undercolor. In no other way can one hope to keep up the color in the flights, tails and hackles. If both sexes have dark undercolor good black will be obtained with a decided chance of having too much of it in the chickens, yet, if both sexes are young birds when mated, I believe in dark undercolor on both sides. But young birds on both sides do not make the ideal mating for me. I like to have hens eighteen months to thirty months old, which, as pullets, had too much black in the back, but as hens have clear, white backs, with white undercolor, but good, black flights and tails and well penciled hackles. For such hens select a big-boned cockerel, having a well formed tail, with almost solid black flights, brilliant black in tail and the hackles striped well up toward his head. From this mating will come such chickens as will delight a Light Brahma fancier's heart.

If one must use pullets and he has a two-year-old cock, it will be best to put them together. If these pullets have dark undercolor, intensely black flights and tail, and a hackle that is heavily penciled, the cock can be white in undercolor and have a narrow stripe in the hackle, but where he is black it is desirable that the black should be brilliant in color. This is a good mating, but not quite equal to the previous one.

The secret of mating Light Brahmas is to secure dark undercolor in one sex.

Penciled coverts add much to the beauty of a Light Brahma's tail, and in all matings it is well to select breeders having this feature well developed, but such coverts should not be selected at the expense of the hackles and the desired black in flights and tails.

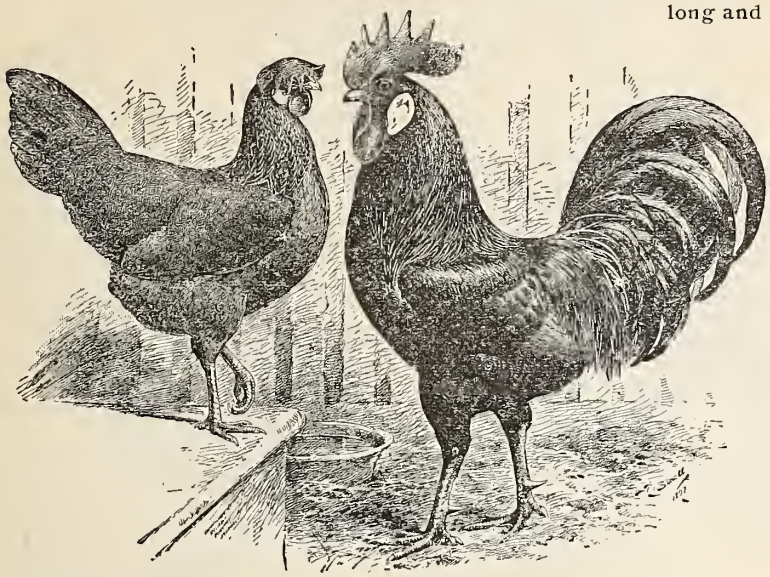
In mating for shape I like to have the birds, especially the hens, rather short in leg and with a true Brahma back. I do not like to see much tendency to cushion in the backs, though a bird fine in other respects should not be rejected because of this tendency. No better description of the male's back has ever been given than the following: The back should curve so that the outlines of a Brahma egg, big end at the base of the hackle, would just fit in it. This gives a graceful curve to the neck and that fine upward sweep to the saddle that makes a true Brahma back for a male bird. The male to head the breeding pen should have just such a back, and if he is mated to very short-legged hens he may have a moderately long shank, but should not reach the old-fashioned Shanghai type. It is always to be remembered that you cannot get style on a bird unless you have some daylight beneath him. While we do not wish to breed our Brahmas to the old Shanghai type, with the remarkably long legs and neck, neither do we wish to transform them into creepers. What we want is just enough shank to give us style and not a particle more. To secure this in our matings we select the short-legged type of females and trust to the male to add just enough in shank to preserve the true and graceful American type.

The tail has been spoken of as well-formed. By this is meant that the two sides meeting at the top spread out laterally so as to form something like the sides of a capital A, or a capital V inverted. Occasionally a Brahma will be found with a pointed tail, a suggestion of the desired shape in the Game, but the well-spread tail is what is wanted in the Brahma for exhibition or breeding, and the pointed tail is what is to be avoided.

And finally a word about combs. Select the very best and finest combs possible to be found in the females, and in the male a similar, but somewhat larger comb. My ideal of a true Brahma comb is to have the middle section somewhat higher than those on the sides, with seven well-defined serrations or points, the sides each with five points, and the whole comb arched on top to correspond with the curvature of the crown of the head, the whole also fitting firmly and closely to the head, so that it will not shake or show any tendency to lop. It must, thesefore, have a broad base. A good comb adds the finishing touch to a beautiful bird, and is a point that every fancier will cultivate.

And when one has secured a Light Brahma with a nearly perfect comb, well-penciled hackles and coverts, black flights and tail, of typical shape and size, he has a most valuable fowl and one that will bring a long price. Such a fowl while none the less useful because of its beauty, is, because

of its beauty, one to command admiration and coax gold out of the pockets of the observers, and to produce such is a triumph of the breeder's art, well worth the careful study of the stock and the necessary considerations of mating.



Standard-Bred Single Comb Brown Leghorns.

THE LEGHORNS, BROWN AND WHITE.

The Egg Machine of Poultrydom—An Article on Mating Single Comb Brown Leghorns—Also White Leghorns. The Rose Comb Varieties.

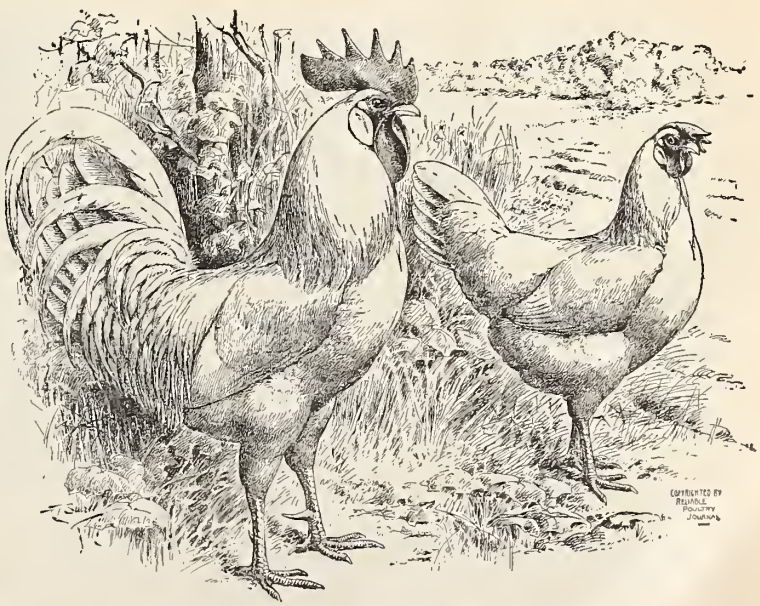
Note—The Leghorns (of which there are five desirable varieties, the Single Comb Brown, the Single Comb White, the Rose Comb Brown, the Rose Comb White and the Single Comb Buff) are well known as the great egg-producers of poultrydom. Where eggs alone, in large numbers are wanted, the Leghorns are the most desirable fowl. We are a great admirer of the Leghorns. They are a neat, thrifty, handsome and profitable fowl and will never cease to be popular. The Rose Comb White and Brown Leghorns are identical with the Single Comb varieties, except that they have the rose comb, or the Wyandotte comb, in place of the tall, frost-inviter of the latter. We have bred all five varieties. The Rose Comb we took up on account of the steady demand for them in northern latitudes, arising from the superior laying qualities of all Leghorns, and the fact that the Rose Comb varieties are less liable to frost-bite. A hen with a frozen or badly bitten comb will cease laying. We found that the Rose Comb varieties lay equally as well as do their Single Comb cousins. Where Leghorns are wanted in northern latitudes, we recommend the Rose Combs, either White or Brown.—Ed.

Mating Single Comb Brown Leghorns.

BY MR. F. H. SHELLABARGER, JUDGE AND BREEDER.

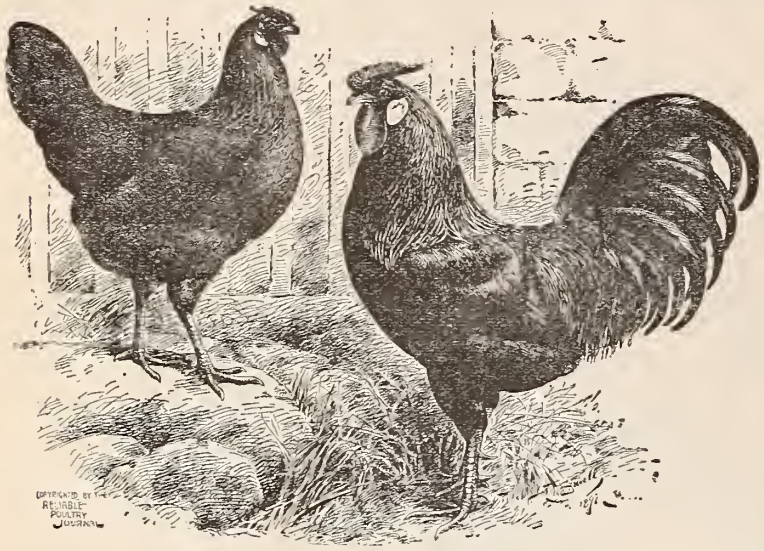
In mating this variety to produce chicks of the standard requirements, first the breeder must consider the quality of stock he is breeding from. The male should have as many desirable features as it is possible to get, beginning with size. He should be of good style, with well arched neck, a straight five point comb, medium size and free from twists in front; with smooth, white ear-lobes of medium size; wattles well developed and free from folds; breast full and round and carried well forward; back medium, though not long and having a gentle sweep from center to tail; wings should be rather large, having quite large flights, well folded; tail should be well spread, carried well up; sickles and coverts well developed, showing lustrous green; legs should be of good length and toes straight. Fully fifty per cent of the Brown Leghorns all over the country are too short-legged, which spoils symmetry. In most cases they are under size and inclined to run too much to the bantam in that respect. So, in selecting a male, see to it that he is well up in size, and has good length of legs. Color can be summed up in a few words: Neck feathers should have a distinct black stripe edged with brilliant red, and this edging of red should circle the lower two-thirds of the feathers, so that the black stripe does not show out on the end of the feathers. You then have a well laced hackle. Saddle should be the same as to color and lacings. The under color in all sections should be dark slate, free from white. Color of legs and toes yellow. Be careful to guard against any tendency to flesh color, as in some cases the finest colored earlobes are to be found on birds with pale shanks. Use only such as have yellow shanks, free from feathers or down.

In selecting mates, get females that are of good style and size, with combs medium, and those that lap the entire length of comb, and when viewed from in front, such as do not fall across the head, but such as lap and form a true arch in front, free from twists. This, you say, is hard to get, yet, nevertheless, they come that way when bred right. If over one-half of the females in the pen have well serrated combs and they are perfectly upright, so much the better for breeding cockerels with straight combs. Consider ear-lobes and wattles the same as on the male; then examine the color of neck or hackle, and get a black stripe with an orange yellow edging around each feather and as little penciling in the black stripe as possible. Wings in females are



Standard-Bred Single Comb White Leghorns.

very frequently found with a brick color on bows. This is objectionable, yet is very hard to breed out. We are of the opinion that where continual breeding is resorted to for a few years with females that show none of this red on wings the result will be cockerels with large dark bar and scarcely



Standard-Bred Rose Comb Brown Leghorns.

any red on wing bows, thus making it tit for tat—what is gained in the color of the female is lost in the color of the male. So, if the females show a small amount of red on wings, all the better for the cockerels from such a mating. Be careful to select such as show backs well penciled with dark brown, and such as are penciled closer up to the web of each feather, not open with dark stripe along each side of the shaft, causing the back to look too dark. Select females with good length of legs, fairly long in body, with good, upright carriage, and the results should be fine chicks.

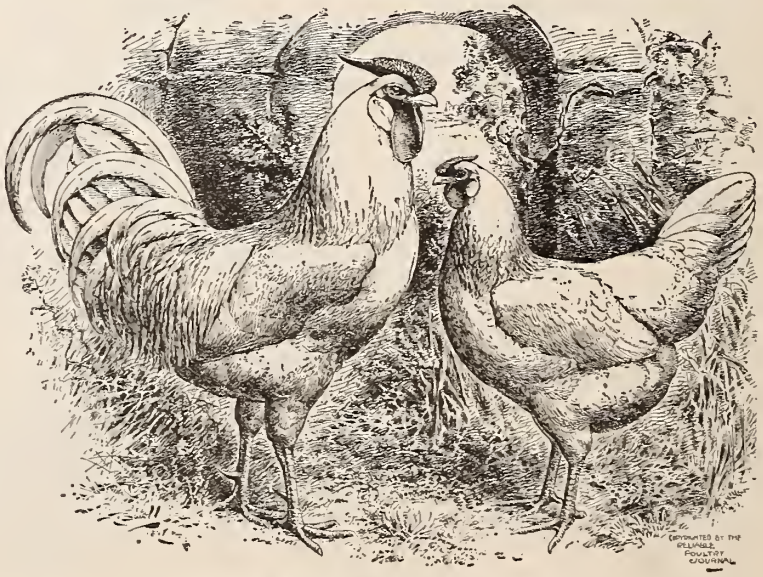
Mating White Leghorns.

[Prize Essay in Fanciers' Gazette, London, England.]

Here, perhaps, the amateur may obtain better results in the way of both sexes from one breeding pen than it is possible to do in the Browns, though I very much doubt whether it be possible for him to do as well as if he mated separately. Pay attention to all the general Leghorn characteristics, as described in my notes on Browns; and further, see that your cock bird is free from straw color on his back and saddle feathers, and that both he and his mates have a good depth of color in their legs, as there has in many strains come a tendency to paleness in leg, brought about probably by the efforts to keep the plumage as pure in color as possible; for while I do not agree with some who assert that a canary tint is correct in a White Leghorn—and I do much prefer a pure white color—I must admit that it is preferable to have a faint tinge of yellow color in the plumage combined with a lovely yellow leg, rather than the pale, washy legs one sometimes sees exhibited. In the breeding of Whites, those who can find trees and other natural shade, or failing this, who provide artificial shade, will be wise to avail themselves of it, and can not fail, especially in a strong season, when we get "first a shower and then a shine," to reap great benefits therefrom; for it is such a season as above described, rather than a tropical summer, that strains an otherwise white bird's plumage.

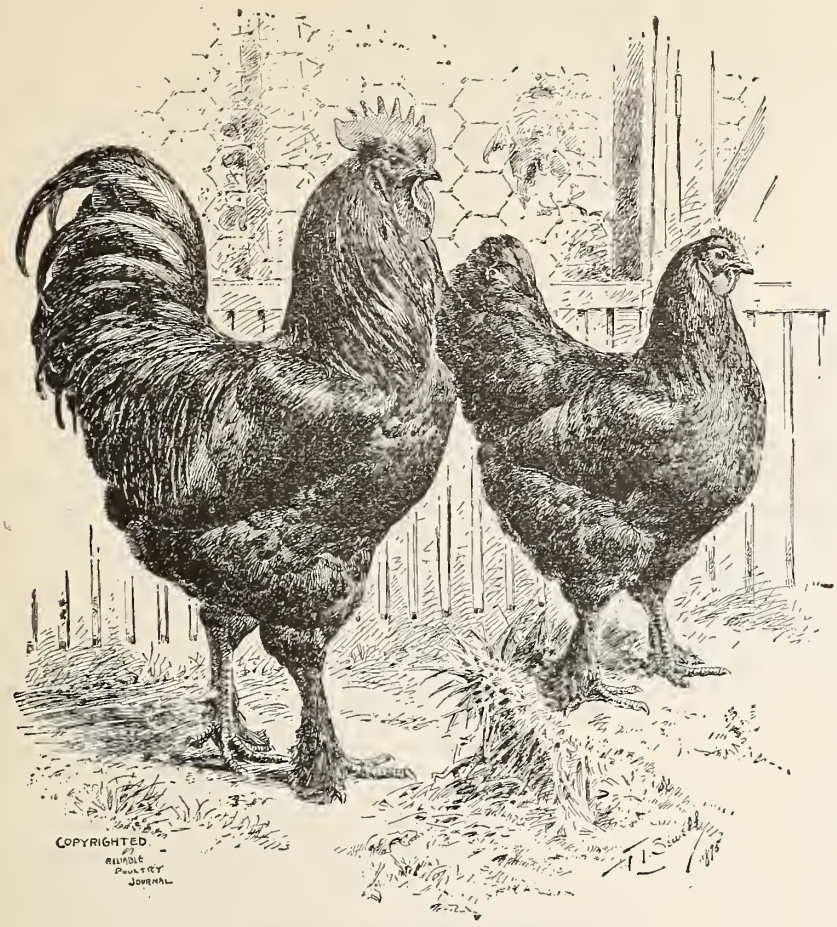
BLACK LANGSHANS.

The Black Langshans, owing to their beauty of form and feather are often called the lordly Langshans. They are esteemed very highly by many people. The surface color of the plumage of both the male and female is a glossy, metallic black, showing a green sheen. The undercolor is black or dark slate. The standard weights of the Langshans are as follows: Cock, ten pounds; hen, seven pounds; cockerel, eight pounds; pullet, six pounds. Langshans are fair to good layers, especially in winter time. They are superior to the Cochins as layers and about as good, or a little better, than Brahmas in this respect. They are smaller and somewhat more active than Brahmas, which accounts no doubt for their being somewhat better layers. The flesh of the Langshan is moderately fine in texture, juicy and palatable, but they are not so popular as they should be as table fowl, owing to two facts; namely, their skin is white, and it is almost impossible to put them on the market as dressed fowl in an attractive condition, owing to the black pin feathers. Where people have a preference for black fowls, large in size, docile, fair to good layers, strikingly handsome, the lordly Langshan will fill the bill and render a good account of itself. In breeding Langshans to standard requirements, their besetting sin is white or gray in the plumage and purple barring which comes in the glossy black surface plumage in place of the even, green sheen which should exist in the surface plumage of the upper half of the body on both male and female. Any white or gray whatever in fowls that are meant to be solid black is an eye-sore and a serious defect. Furthermore, all black fowls are made particularly handsome by the rich, metallic green sheen, and this is not an easy characteristic to establish in a strain. Beginners with



Standard-Bred Rose Comb White Leghorns.

poultry are prone to make the mistake of believing that solid colored varieties, Black Langshans, Buff Cochins, White Wyandottes, and so on, are much easier to breed than the parti-colored varieties like Barred Plymouth Rocks, Partridge Cochins and Silver Laced Wyandottes. This is no doubt partly correct, but ninety-nine out of a hundred breeders of solid colored fowls will dispute this belief in toto and insist that it is substantially as hard to breed solid colored



Standard-Bred Black Langshans.

fowls close to standard requirements as it is the parti-colored fowls. This is an extreme view for them to take, but the fact remains that the breeders of solid colored fowls are less than two points ahead of the breeders of parti-colored fowls, which is evidenced by the fact that a handicap of only one to one and a half points is placed on solid colored fowls at the poultry exhibitions when they are to compete with parti-colored fowls for special prizes. Another way of arriving at the comparative difficulty of breeding solid colored and parti-colored fowls to standard requirements is to be found in the fact that the best scores given to parti-colored fowls by our best judges range from 93 to 94 points, while the best scores given by the same judges to the best solid colored fowls produced during the past three or four seasons have ranged from 94 to 96 points. This shows the matter up pretty clearly. The fact is that black feathers will creep into the plumage of white birds, and a creamy shade is very often evident in the white plumage. In Buff breeds both black and white cause trouble, and haste in breeding out one of these defects is apt to result in the creation of the other. Keeping the white out of the plumage of a Black Langshan is no child's play. It is plain enough that the breeder of solid colored fowls who wishes to reach the very top has his mountain to climb and need not sit down early in the contest to weep for more worlds to conquer.

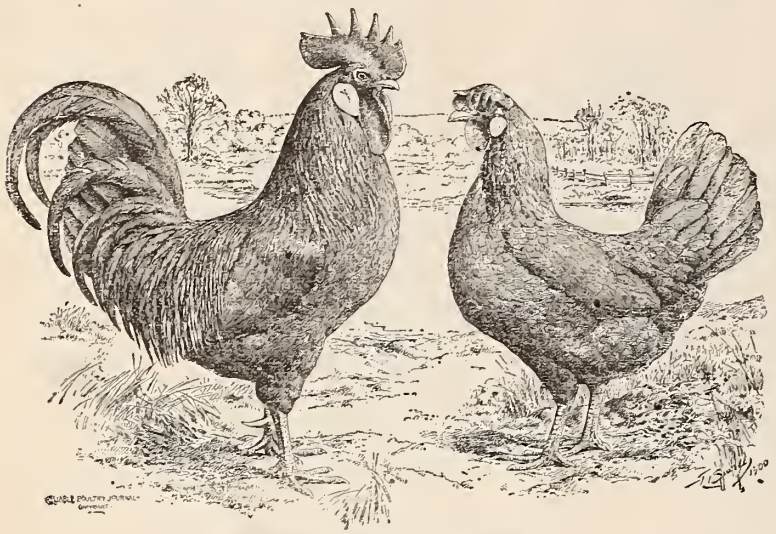
BUFF COCHINS.

In the Buff Cochins we have a beautiful and fairly popular fowl. When well bred they are considered to be the most artistically beautiful fowl in existence. Bred to standard requirements, their plumage is of a soft, uniform, golden buff, the feathers standing well out from the body, and, being loose and fluffy, they give the bird a round and graceful form that is not duplicated in any other breed of standard fowls. It is no doubt true that the best Buff Cochins have been bred to such an extreme in length and fluffiness of feather that they are not well suited for practical purposes, in fact, the beautiful has transgressed more or less on the useful, although to what extent we are unable to say. It is not part of the object of this book to go into a lengthy discussion of questions of this kind, but breeders who propose to go into the poultry business for practical purposes can find in the list of standard fowls varieties that excel the Cochins as table fowl, as layers and as broilers. This is likewise true of the Light Brahmas and Black Langshans.

On the other hand, where a moderate sized flock of beautiful fowls is wanted for the city lawn or the village lot, nothing more beautiful, more docile or more satisfactory, taken all in all, can be found than the Cochins, the Brahmas or Langshans. It should be remembered, however, that these Asiatics are more sluggish, are poorer layers, and therefore less productive than the medium sized and small varieties belonging to the American and Mediterranean classes. It is not our object in writing for this

Standard-Bred Buff Cochins.

book to serve the interests of any one breed or variety. What we are aiming to do is to state facts for the information of the readers. Said a well-known Ohio judge and breeder to us: "The Cochins are a nuisance. Those of us who breed them have to import stock from England to perpetuate the breed--they are such poor layers." This is an extreme view, but there is an excuse for it.



Standard-Bred Buff Leghorns.

In the January, 1898, number of the Reliable Poultry Journal was printed a color plate of a pair of Buff Cochins, copied from a painting by Franklane L. Sewell, the noted poultry artist, who had for models two of the best Buff Cochins from the yards of Messrs. Sharp Brothers, breeders of prize-winning Buff Cochins. They are said to be a pair of the best colored buff birds that have ever been bred. This reproduction served to create new friends not only for Buff Cochins, but for buff fowls in general. Mr. Sewell, writing on the subject in that number of the Journal, says this in conclusion:

"The art of producing the buff plumage of fowls has not, in the race of Cochins especially, received its reward of success at small cost, or without many years of constant care and thoughtful breeding and selection. Those who of late years here in America have undertaken the breeding of the newer buff varieties have realized some of the difficulties that must have worried the earlier breeders of the Buff Cochin. However, even with all the difficulties which the handlers of Buff Cochins have met, I imagine that the soft tones of color are more favorably bred in the loose, fluffy plumage of the Cochin than will be obtained in some of the races for which the clear buff feathering is now so studiously sought. We have referred to the varying lights and changeable reflections which influence the apparent color of plumage on a fowl. This is charmingly so in the case of the full-feathered and deep-fluffed Buff Cochin. The slightest movement and change of pose in the bird, presents to the sensitive eye such a fascinating picture that it can not be satisfied with a passing glance. These alluring, mellow lights that seem to play about the soft plumage of these buff beauties are to the eye restful contrasts to the kaleidoscopic brilliancies that dazzle the sight as one attempts to follow their changes over the surface of the nervously moving, fiery hackled Leghorn."

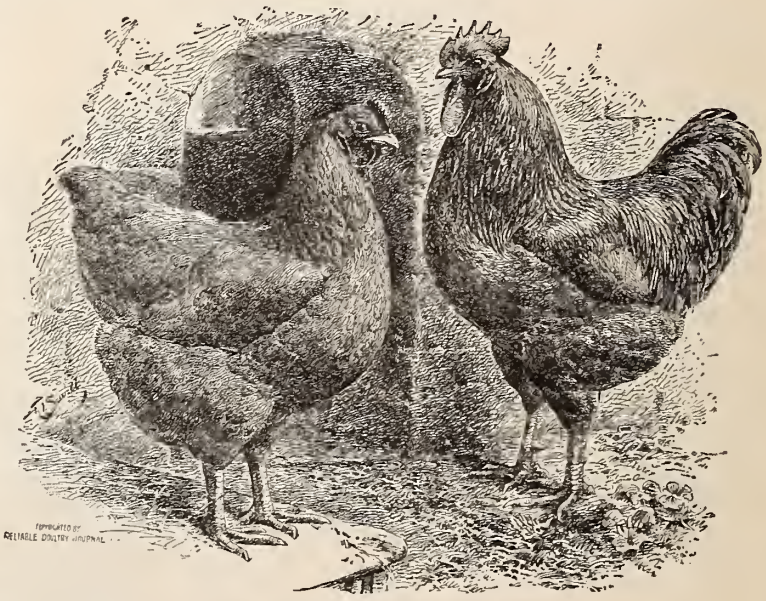
The full-feathered Buff Cochin, while being a wonderful extreme in its amount and quality of feather, displays the nicest harmony of blended color which poultry fanciers possess.

The Cochin breed includes four varieties, the Buff, Partridge, White and Black. The Buff variety is the most popular, the Partridge coming in second. The standard weights of Cochins are as follows: Cock, eleven pounds; hen, eight and one-half pounds; cockerel, nine pounds, pullet, seven pounds, excepting in Black Cochins, where the cock should weigh ten and a half pounds.

NEW BUFF VARIETIES OF STANDARD BREEDS.

They Comprise the Buff Plymouth Rocks, the Buff Wyandottes and Buff Leghorns—Rapid Growth in Popularity.

During the past few years there has been a craze for buff plumaged birds, and many of the oldest and most level-headed fanciers have caught the fever and have been quietly experimenting with one of the varieties of buff fowls. The breeders of Buff Cochins have undoubtedly made great progress in getting the beautiful shade of buff so fixed that a large per cent of the birds will come true, but the fanciers of Buff Cochins have also bred their birds with a view to forming a ball of feathers, until the practical farmer who looks to the egg basket for groceries, refuses to buy them. The presence of feathers on the legs has limited their demand and doubtless led to the introduction of other buff breeds free from feathers on the legs, but which possess at the same time all the advantages of a buff fowl. These new breeds are Buff Plymouth Rocks, Buff Wyandottes and Buff Leghorns, the first two being general purpose fowls.

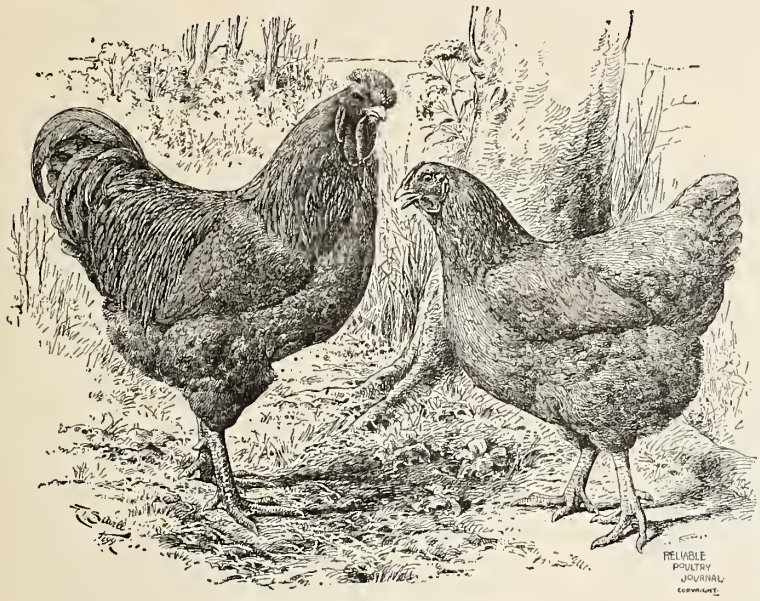


Standard-Bred Buff Plymouth Rocks.

A close inspection of the cuts of Buff Rocks, Buff Leghorns and Buff Wyandottes presented herewith will disclose that in the matter of shape they are like the other varieties of the same breeds. This is as it should be—form is the first thing to be considered; the dress is another matter.

Breeders of these new varieties of Rocks, Leghorns and Wyandottes have succeeded in producing some fowls of a wonderful shade of buff, and each year the color culls are

fewer than the preceding. When these varieties were originated a few years ago many of them came too red or too pale in shade, but almost any color can be fixed by patient breeding from year to year and now some breeders have strains that will reproduce their color in large proportion. Some years ago the poultry judge, Mr. Theo. Hewes, in answering an inquiry about Buff Wyandottes, with which he



Standard-bred Buff Wyandottes.

had been experimenting, said to the questioner that it would be well for amateurs to let such breeds remain in the hands of old fanciers until the color is more firmly established, and the time has now arrived when the color is established, so that any young breeder, with such an application of intelligence as is needed in handling the older breeds, may breed these new-comers true to color.

The putting on of a buff dress should in no degree injure the good qualities of any breed, either in weight shape, or egg-producing qualities; in fact, as we have said, it improves the appearance of the dressed fowls.

We thought Mr. Sewell had reached the height of perfection in the Cochin illustration in colors which appeared in the Reliable Poultry Journal of January, 1898, but when the Reliable Journal of December, 1899, came upon us with another grand work in colors by the same artist—a pair of Buff Plymouth Rocks, we acknowledged that this work (to a breeder of the variety) eclipsed even the first named. The hand of a fancier has indeed wielded the brush, and the secrets (if there be any) of the up-to-date breeder and exhibitor of Buff Rocks stand out upon every section of the birds depicted.

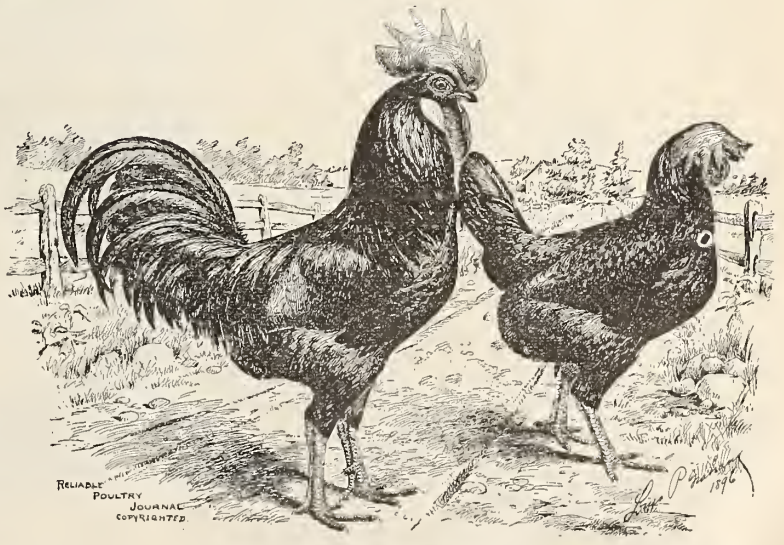
All Leghorns lay well and the Buff variety is not behind the others. It lays an egg equaling (in many strains) the size of that laid by the White Leghorn, and many flocks of Buffs have an advantage in size of body.

As general purpose fowls the Buff Rocks and Wyandottes possess the qualifications of the other varieties of these breeds, with the additional advantage of a color of plumage which assists in securing the yellow skin desired by the public. The fact that the pin feathers are of a color similar to that of the skin, adds to their value as market fowls, as these pin feathers are barely noticed, even when the fowls have not been very carefully plucked. The Buff breeds are favorites, and they have proven such valuable fowls from the utility point of view that the public says they must stay, and the public knows.

BLACK MINORCAS.

Black Minorcas have come to be quite popular in America, though not nearly so popular as the Single Comb Brown and White Leghorns. The Minorcas seek to rival the Leghorns as layers, but they have hardly succeeded. They are in fact great layers, and as such are valuable fowls. They have two important advantages over the Leghorns, viz: They are considerably larger and heavier and lay a larger egg. There are no standard weights for Leghorns, but they range in size from four and one-half to six pounds for male birds, and four to five pounds for females, while the standard weights of Minorcas are as follows: Cock, eight pounds; hen six and one-half pounds; cockerel, six and one-half pounds; pullet, five and one-half pounds. The Minorcas lay a handsome, large, pure white egg and lay a good many of them.

In color of plumage they should be a rich, glossy black throughout, showing an absence of purple barring, and having the same rich green sheen that is so desirable in Black Langshans. This sheen is not required by the Standard to the same extent as it is in Langshans, but it should be. Any white or gray in Black Minorcas is as serious a defect as in Black Langshans and should disqualify specimens for breeding purposes, except in cases where an off-colored feather is the result of an accident, like a bruised pin-feather or the bird being out of condition when molting. It is dangerous to compromise at all with white in the plumage of black fowls, for too often breeders are too lenient in this respect, the result being a cropping out of white or partially white feathers in their strain, to its ruination.

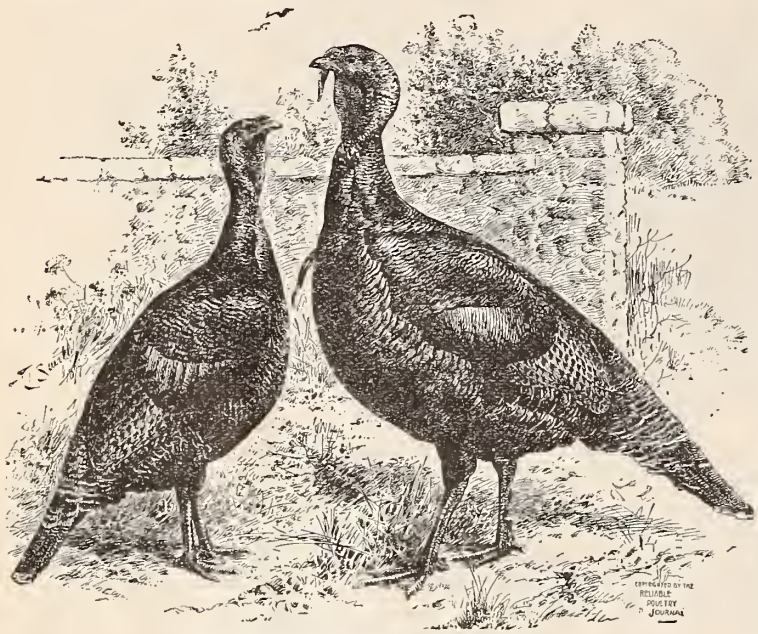


Standard-bred Black Minorcas.

The Minorcas include as a breed the Blacks, Whites and Rose Comb Blacks. The Whites are the same as the Blacks, excepting that their plumage is pure white throughout, and their legs are of a flesh color instead of slate color. The Rose Comb Blacks are the same as the Single Comb Blacks, except comb. For views of a Rose Comb see illustration of Rose Comb White and Brown Leghorns in these pages.

MAMMOTH BRONZE TURKEYS.

Bronze turkeys are by far the most popular variety of turkeys bred in this country. There are six standard varieties of turkeys, viz; the Bronze, White, Buff, Slate, Black and Narragansett. Next to the Bronze the White Holland is most popular. The standard weights of Bronze turkeys are as follows: Adult cock, thirty-five pounds; yearling cock, thirty-two pounds; cockerel, twenty-four pounds; hen, twenty pounds; pullet, fifteen pounds. The Bronze turkey is perhaps the most beautiful bird in poultrydom. Their



Standard-bred Mammoth Bronze Turkeys.

plumage is iridecent in color, having all the tints of the rainbow and about a dozen more. We understand that they were bred from the wild turkey, The wild turkey is a handsome bird, but not to be compared with the standard-bred Mammoth Bronze.

In Bronze turkeys the size of the wild turkey has been much improved on, in fact, Bronze turkeys have been bred so large as to make them unsaleable on the market. In other words, it is not desireable to breed them too large. The benefit of breeding them to extra size is that they are of quicker growth, and hence will sell on the market when younger more tender and less costly to produce. Ninety per cent of the turkeys sold on the common market are Bronze, or part Bronze. The smaller they are, as a rule, the less pure-bred Bronze there is about them. Where a flock of fine, large turkeys is seen, it may be taken for granted that there is more or less Bronze blood in their veins.

It is useless to attempt to raise turkeys on a small lot. They must have range. Some breeders turn their flocks into a wooded place and let them grow in nature's way—the way of the wild turkeys which live in the woods.

The accompanying illustration by Artist Sewell is one of the best ever made showing standard-bred Mammoth Bronze turkeys true to life. In the following pages of this book will be found a complete and valuable article on the care and management of turkeys, written by Mrs. S. N. King, a breeder of years' experience.

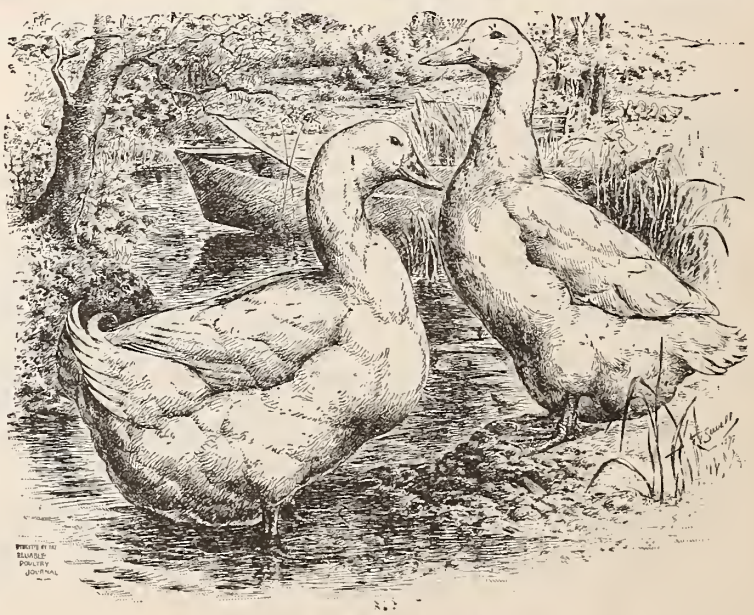
IMPERIAL PEKIN DUCKS.

Unquestionably the Business Duck of the Age—Handsome, Thrifty, Easy to Raise, Productive, Profitable—Thousands Hatched and Reared by Artificial Means.

By Mr. James Rankin, Breeder.

The Pekin ducks are first-class layers, producing from 100 to 120 eggs each per year. It is a very fascinating work to raise ducks, they mature so quickly, the mortality is so small, and the grower, if he works his cards right, has complete control over them from beginning to end. Our mortality is about one per cent, and that principly by accident. A duckling will weigh more at nine weeks old than a chick at twenty weeks. We grow all our poultry artificially, getting out from 4,000 to 5,000 ducklings and from 2,000 to 3,000 chicks yearly. We ship our ducklings to both Boston and New York, sometimes to both the same day. The maximum price for ducklings the past season was forty cents per pound, the minimum thirteen cents, and as these ducklings dress on the average nine pounds per pair at nine weeks old, and can be put upon the market at a cost of less than five cents per pound, it can be easily seen what profits attend the business.

We obtain from four to five cents per pound more than the highest market rates for our birds both in New York and Boston. Our dealers in both places will gladly corroborate this statement. We mention this in particular in order to disprove a wide-spread but erroneous opinion which prevails over the country that artificially grown birds are inferior in every respect to those grown in a natural way. Our ducklings are the largest of their age that enter the Boston and New York markets,



Standard-bred Imperial Pekin Ducks.

and not only that, but they have won the first premiums the past year all over the country for their size and beauty, while not only the birds themselves, but their parents and grandparents, together with a long line of ancestors have been hatched and grown artificially.

We find no trouble in getting rid of our surplus eggs in market at remunerative prices. We find ducks during the summer months much more profitable than chicks. The

feathers are worth fifty cents per pound at wholesale, making quite an item of profit.

Hard grain is not so good for Pekins as soft food. We keep our laying ducks (of which we keep some eleven hundred) on equal parts of boiled turnips, wheat bran and corn meal, with a little ground beef scraps thrown in. This is all mixed thoroughly together while the turnips are hot, and constitutes our entire feed during the winter and spring.

I would like here to give a few hints in regard to hatching, raising and handling young ducks. Contrary to the general acceptation of the thing, it is not necessary for ducks, either young or old, to have access either to a pond or a brook, as simply giving them all the water they need to drink is sufficient. Indeed, they thrive better and grow quicker when confined in yards with just enough water to drink. Shade is one of the essentials to duck growing in warm weather, also plenty of green food and vegetables. Ducks are gross feeders, but are not particular as to quality. We have some 2,500 out now, confined in yards, with wire netting two feet high. The first lot go when nine weeks old. Some of them will dress over ten pounds per pair. It is necessary to have water dishes so constructed that they can drink without wetting themselves. Ducklings should be fed about the same as chicks for the first few days, giving them milk if it can be had, by mixing their food with it. Care should be taken the first few days to keep the young ducklings warm and dry. For the first week they will suffer more from cold and wet than chicks; after that time they will endure more of either than chicks. Corn meal exclusively is too much concentrated, and will soon cripple them in the legs and feet; it should be mixed with bran, boiled potatoes, etc. About the same temperature and moisture are required in hatching as with chicks. Ducklings usually pip about forty-eight hours before they are ready to come out. It is a pleasing and comical sight to see three or four hundred young ducklings when first out.

They will fatten much easier and better with simply water to drink. For green food we feed green corn, oats, etc., chopped fine; they like green corn the best. We begin to market ducklings at nine weeks old, picking them clean, all but the head and tips of wings. They are bled by cutting across the roof of the mouth just below the eyes (to stun them with a billet of wood before this operation would be merciful). Ducklings are not drawn for the New York market. Our ducklings last year, dressed for market, averaged at ten weeks old, nine and one-half pounds per pair.

It is well known by this time that the poultry business is as much a trade as any other department in life, and a man, in order to succeed, must possess at least two traits to qualify him for the business—intelligence and energy. His buildings should be neat and commodious, constructed with a view of reducing the labor to a minimum, also of securing good drainage. Above all, start in with good incubators and good brooding apparatus. Secure first-class stock to start with. Debilitated, degenerate stock will never produce healthy young birds, and it is worse than useless to hatch thousands of young birds that come into the world with enfeebled constitutions and in no condition to live, and waste time trying to raise them.

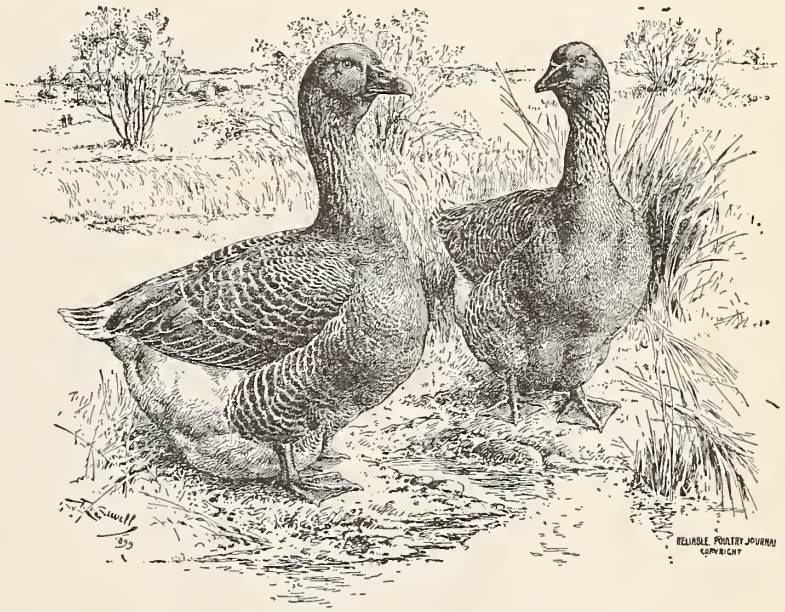
With the demand for dressed poultry, as far as we are concerned, always in excess of the supply, with the returns far greater than from any other farm product, we think that every farm should have its poultry department.

BREEDING TOULOUSE GEESE.

How to Manage Geese with Success and Profit—Why the Toulouse are Best—Care of the Breeders—Must Have Range.

BY CHARLES F. NEWMAN, BREEDER.

The Toulouse goose is in my estimation the most profitable goose to raise. I have made many trials with others, but I now prefer the Toulouse. It grows the largest, matures the quickest, is not so much of a rambler and flyer as other kinds, and as it does not take so readily to water as the other varieties, it grows more rapidly and accumulates flesh faster. They are not so noisy, and you need not be afraid to let your horse stand in the yard for fear the flock might rise and fly away and scare the horse and wagon into flying too.



Standard-bred Toulouse Geese.

The Breeders.

I allow two geese to one gander, though generally they will pair off and you will notice that a gander will stay with his actual mate nearly all the time. The gander is the protector of the goose, especially in breeding time will he defend her and her nest—fearless and vicious. It is not an easy matter to distinguish the sex. When six or seven months old, or at maturity, you can usually, by observation, tell the ganders from the geese. The male, in most cases, grows some larger than the female. The goose is deeper in the body, a trifle slimmer in the neck and smaller in the head. The call of the gander is loud, long and shrill, while that of the goose is merely an answer to it. Separate a flock by driving part on each side of a fence or building and you can distinguish most of the ganders by their calls. Never look for a curled feather in the tail or any outside marks, such as I have seen in some cuts, for there are none. Early in the spring it is easier to tell them, for instance, by tasting, but it must be understood and done with care.

Geese grow to a great age. The females are profitable up to ten or twelve years of age and the males up to six or seven years. It is not profitable to raise geese in confinement. They must have a pasture where from early spring they will live almost exclusively on green rye, clover or grass, needing little grain and thriving well. Do not feed

too much corn in winter, as it is apt to get them too fat for breeders. Oats and barley are better. The way I feed is this: I take some boxes about eight inches deep and put in the oats or whatever grain I want them to have. These I place in the pasture, away from other fowls, and invite them to help themselves. One need not be so careful in feeding them as in feeding ducks and other poultry. You can not spoil their appetites, and by putting the boxes of grain in the runs they get a good run and a light feed, and are in no danger of overfeeding. I should not advise you to feed corn in this way. Give them corn only in the hardest weather, when it is storming or there is so much snow they can not go foraging. Toulouse geese need only enough water to drink, none to swim in.

When in proper condition young geese will lay from eighteen to twenty-four eggs the first season, and old geese will lay from thirty to thirty-six and even forty eggs in a season. Early in the spring I place some boxes and barrels in out-of-the-way places and cover them with rubbish, having straw or litter of some kind inside of them. Some of the geese will begin laying in February, and they will find the places provided for them. We gather the eggs every day, but avoid disturbing a goose when she is on the nest, and we always arrange the nest as nearly as possible the same as we found it. Always leave a nest egg—any kind will do. A goose will cover her egg with the nest material, and in winter instinct teaches her to bury it deep.

Young geese seldom get broody the first year. We seldom let a goose sit, but break them up as soon as they become broody. We put an extra gander in a yard by himself away from the other geese. Into this yard goes the broody goose or geese. Her nest is destroyed, or if it is in a barrel or box it is moved to a new position. In four or five days turn the goose out, and in most cases she has forgotten she wanted to sit and goes to work again. In this way we keep the geese busy laying eggs, and a large common hen attends to the hatching for her.

We put the goose eggs under a hen, setting as many as we can at the same time. On the fifth or sixth day we test the eggs and divide the fertile eggs among the hens, giving each four eggs, which are as many as a hen can well cover. It takes thirty days to hatch them. Then you want to be on the lookout. The hen will sit all right, but when the young ones break the shell and the hen sees a big, green, little creature with a long, wide bill saluting her, she takes it for a freak of nature, and off comes its head! Not many hens will claim the young geese, so take the goslings away as they hatch and try the hens, giving them to a good, slow, gentle hen. As soon as she takes them without any fuss there is no further danger.

Feeding the Goslings.

The first two or three days keep them in a warm place and give them a little soaked bread and water. When the weather is nice turn them out in a small enclosure which can be changed every day or so. Use boards six feet long and twelve inches wide. After a week let them go—and then their foster mother's trouble begins, for the little goslings do not care a snap for her calling. They are off hustling for every spear of grass, and she has to go after them. Her business is to keep them warm at night and warm them in the day time if they get chilled.

The first four or five weeks give them nothing but stale bread occasionally, but always leave them at liberty to get all the grass or clover they want. Do not soak the bread, as they do not like it so well. After five weeks give them a mash of two-thirds bran and one-third corn-meal. If you wish to fatten them, after six weeks feed one-half bran and one-half cracked corn, but do not let it be sloppy. Never allow goslings to go to water to swim until fully feathered, and then only let those go that you wish to keep for breeders. Any of them will do as well if they never go swimming. During this period you must keep the old geese away, as they will fight the hen and molest the young.

It will sometimes happen that you will hatch and raise a gosling with a broken wing. It is no serious fault at all; only a malformation in the egg. If it is a nice, large, promising bird do not kill it nor be apprehensive that it will breed broken-winged birds, for it will not. If the looks of it be unpleasant to you take a sharp knife and sever the crooked part at the joint. Bandage it and it will soon heal and you will never note the difference afterward. You will generally find such to be the largest birds.

Goslings, when nine and ten weeks old, weigh from twelve to fifteen pounds. That is the best time to market them, as they will bring more money then than in the fall and winter and you have no trouble fattening them. The first green geese in the New York and Boston markets this year brought from eighteen to twenty-five cents a pound, and now, when nine months and not weighing much more, they bring from fourteen to eighteen cents. Will you not agree with me that they are profitable to raise? I do not generally paint things in the brightest colors, and I do not advocate everybody going into goose culture. You can not raise geese as you do chickens and ducks—on an acre lot. They must have a pasture. It is a wrong belief that geese or their droppings will kill grass or destroy a pasture. I will explain this as follows: If you have a large flock of geese and a small pasture they will clean it up, that is, they will eat the grass as fast as it sprouts and give it no chance to grow, just as a cow on a city lot will soon have only bare ground and you will have to tie her out in the road. If you could do the same with geese you would find the grass coming again and growing as before.

To provide a good pasture for geese for the late fall, winter and early spring, plow a piece of ground in September and sow it to rye. It will make good picking for them in the winter and provide them with a good living in the early spring before the grass comes in the pasture.

Geese are more profitable than either ducks or chickens, but you can not raise them in such quantities. I have tried, but can not hatch them successfully in incubators. It would be too much work to raise them in brooders. But you can raise quite a flock in a season and make it pay. Have no fear of glutting the market. Green geese always find a ready sale, and there is a good demand in the fall and winter. Their feathers are an item worth considering, but do not pluck your geese twice a year and expect them to be good breeders. A goose so treated will not lay as early, nor as many, nor as fertile eggs as one that is left alone to go through the changes naturally. Always send your fowls to market properly dressed. Never send them alive. The difference in the price of the carcass and the feathers will pay you three-fold for the extra work.

Diseases of Geese.

Geese are easier to raise than any other fowl. There is no mortality among the young stock from disease. Lameness is the only ailment with which I have had to contend. It is caused by too close confinement, unwholesome food, too warm housing, and close quarters in the fall. Let your geese stay out under a shed with some litter under them in the hardest winter weather, and they will be more vigorous than those closely housed.

To treat lameness, proceed as follows: If you notice one that is rather bad, put it by itself in a dry place and give light food (stale bread) and water. If it shows signs of fever and diarrhoea, give a tablespoonful of castor oil by holding

its beak open and working it down its throat. Repeat the second day if it is no better.

Do not mistake the common crown goose for the Toulouse. The following is a short description of the Toulouse:

Head, large and short, especially in the gander; color, dark-gray; beak, reddish-flesh, not pink; eyes, dark brown, or hazel; neck on gander, long and carried erect—by long I do not mean extremely long; neck of goose, medium in length; plumage, dark gray, shading a trifle lighter toward the beak; back slightly curved, long and broad, color dark gray; breast, full and deep, plumage light gray, not white; body round and deep, in old birds in good condition it almost touches the ground; plumage down to the keel is light gray; the lower and fluffy parts are pure white.

The tail ought to be short, in color black and white, the ends of the feathers being white. Wings, strong and large, with smoothly folded, dark gray primaries, brown secondaries and dark gray coverts. Thighs, short and stout, covered by light gray plumage, distinctly laced. Shanks and web of feet, dark orange color, not pink. White feathers in wings, or any other part of body other than above mentioned, shows impure breeding.

The weight differs in various seasons. In winter they should be kept in good condition. The old geese should average about twenty pounds, the young about eighteen pounds. I have some weighing from twenty-six to twenty-eight pounds.

There is still much to be said about the variety of geese, and a wide field open for discussion. Who has not heard of "Hanover Ganze Biuste," Hanover smoked geese breasts, which sell in Europe in the finest delicatessan stores at eighty cents and one dollar a pound? And have you ever heard of goose livers selling at two dollars to three dollars per dozen? That is for the livers only. You can sell lots of them every day in New York and other large cities—if you only have them.

CHARACTERISTICS OF BREEDS.

Table Showing the Merits of the Different Breeds of Fowls, Ducks, Geese and Turkeys.

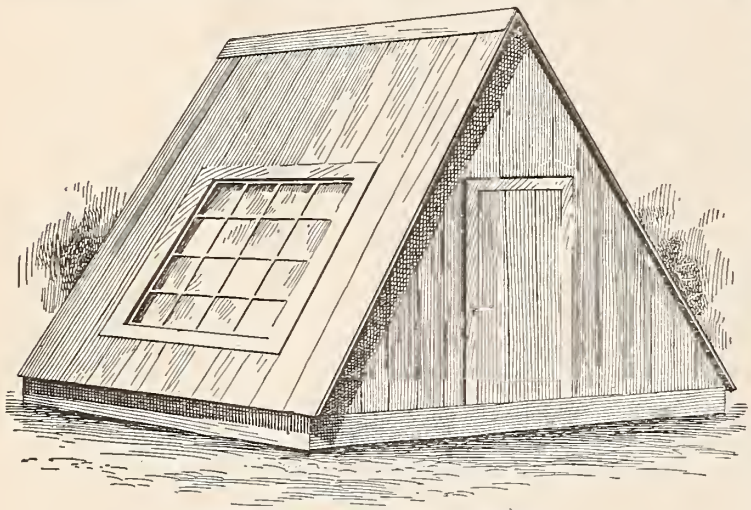
BREEDS.	Live weight of cock, in pounds.	Live weight of hen, in pounds.	Age at maturity in months.	Cost of raising to maturity.	Annual cost of keeping.	Average egg yield per year.	Average number of eggs to pound.	Constitution.	As foragers.	Can they stand confinement?	As sitters.	As mothers.	Grain and flavor of flesh.
Light Brahmas	12	9½	12	.75	$0.90	150	7	Hardy.	Fair.	Yes.	Heavy.	Clumsy.	Fair.
Buff Cochins	11	8½	12	.75	.90	140	8	Average.	Poor.	Yes.	Fair.	Fair.	Poor.
Partridge Cochins	11	8½	12	.75	.90	120	8½	Average.	Poor.	Yes.	Heavy.	Clumsy.	Fair.
Black Langshans	10	7	12	.75	.90	150	8	Hardy.	Fair.	Yes.	Fair.	Fair.	Good.
Barred Plymouth Rocks	9½	7½	10	.75	.90	175	8½	Hardy.	Good.	Yes.	Fine.	Good.	Good.
White Plymouth Rocks	9½	7½	10	.75	.90	175	8½	Hardy.	Good.	Yes.	Fine.	Good.	Good.
Buff Plymouth Rocks	9½	7½	10	.75	.90	175	8½	Hardy.	Good.	Yes.	Fine.	Good.	Good.
Silver Laced Wyandottes	8½	6½	10	.70	.80	175	9	Average.	Good.	Yes.	Fine.	Good.	Good.
White Wyandottes	8½	6½	10	.70	.80	175	9	Average.	Good.	Yes.	Fine.	Good.	Good.
Buff Wyandottes	8½	6½	10	.70	.80	175	9	Average.	Good.	Yes.	Fine.	Good.	Good.
Cornish Indian Games	9	6½	10	.75	.90	130	9	Tender.	Fair.	Yes.	Fair.	Fair.	Fine.
Hamburgs	4	3	7	.40	.75	180	12	Tender.	Good.	Yes.	Non.	Poor.	Best.
Houdans	7½	5	10	.70	.90	170	9	Average.	Good.	Yes.	Fair.	Poor.	Good.
Dorkings	6½	5½	9	.65	.75	120	9	Tender.	Good.	No.	Good.	Good.	Good.
Dominiques	5½	4½	7	.60	.75	170	10	Hardy.	Good.	No.	Good.	Good.	Good.
Games, B. B. R.	7½	5	8	.70	.80	170	10	Hardy.	Good.	No.	Fine.	Best.	Good.
White Leghorns	5	4	7	.40	.75	200	10	Hardy.	Fine.	Yes.	Non.	Poor.	Poor.
Brown Leghorns	5	4	7	.40	.75	200	10	Hardy.	Fine.	Yes.	Non.	Poor.	Poor.
Buff Leghorns	5	4	7	.40	.75	200	10	Hardy.	Fine.	Yes.	Non.	Poor.	Poor.
Black Spanish	7	6	9	.70	.80	170	7½	Average.	Good.	Yes.	Non.	Bad.	Poor.
Polish	5½	3½	7	.50	.75	170	11	Tender.	Good.	No.	Non.	Poor.	Poor.
Black Minorcas	8	6½	9	.70	.80	180	9	Hardy.	Good.	Yes.	Non.	Poor.	Fair.
Common	4½	3½	9	.50	.75	150	11	Average.	Good.	Yes.	Good.	Good.	Fair.
Ducks, Pekin	7½	6	9	1.00	1.00	120	8	Hardy.	Fair.	Yes.	Good.	Good.	Good.
Ducks, Rouen	7½	6	12	1.10	1.00	100	6	Hardy.	Fair.	Yes.	Poor.	Good.	Good.
Ducks, Common	4	3½	6	.75	1.00	90	9	Hardy.	Good.	Yes.	Good.	Good.	Fair.
Geese, Toulouse	22	18	36	2.00	1.50	30	3½	Hardy.	Fair.	No.	Fair.	Fair.	Fine.
Geese, Embden	18	15	30	1.75	1.50	20	3½	Tender.	Fair.	No.	Fair.	Fair.	Fine.
Geese, Common	10	7	12	1.25	1.50	20	4	Hardy.	Fine.	No.	Good.	Good.	Fine.
Turkeys, Bronze	28	18	24	2.00	1.20	50	6	Tender.	Fine.	No.	Fair.	Fair.	Fine.
Turkeys, Common	12	10	12	1.20	1.00	50	7	Tender.	Fine.	No.	Fair.	Fair.	Fine.

PRACTICAL POULTRY HOUSES.

The Ideal Low-Cost New England House—A Double House Costing Fifty Dollars—A Low-Cost House for the Farmer—Latest Improved Open Scratching Shed, Double or Continuous Houses—An All-'round, Complete Poultry House, as Designed by an Expert Fancier.

WE PRESENT in this chapter not a large and confusing variety of low-cost poultry houses, but such houses as are calculated to meet the needs of a large majority of the readers of this book. The several houses are materially different in design, and may be enlarged or modified to meet varying conditions. They are practical, and no money need be wasted in their construction.

At this point we wish to caution the readers against extravagance in building a poultry house. Do not spend a



Ideal New England Poultry House.

dollar, not a dime, when it can be properly avoided. That is one secret of success in the poultry business. Have your poultry house built so as to keep out all drafts, but, bear in mind that nature has provided fowls with a warm coat of feathers, and that if gradually hardened they will stand a surprising amount of cold weather. Even a Leghorn cock or cockerel will stand a night or two of twelve degrees below zero (outside temperature) in houses constructed as we advise in this chapter, without injury to his tail and slender comb, providing he has been hardened to it. We write from experience.

Do not use artificial heat for adult fowls except in the case of Leghorns or Minorcas in northern latitudes during very cold weather. They do not need it. It is far better for them not to have it. Build your houses snug against the wind, put some glass where direct sunlight will flood the dirt floor, leave the chicken exit open day and night; except in rare instances let them go in and out of the house when they please, and they will in this way become toughened until the severe cold will not injure their general health. Feed them regularly on sound, wholesome, nourishing food; keep them at work as many hours of the day as possible—but we are getting ahead of our story.

With the exception of the Leghorns and other similar varieties, poultry will withstand the winters of our northern climate right well, and will be free from disease if they are provided with quarters where they can seek shelter from wind and rain in the day time and be protected from drafts at night. It is the unhealthy fowl, the fowl that has been abused either by neglect or by too much kindness, that cannot withstand winter weather. Proper food well digested makes thick, warm blood—but this is subject matter for another chapter.

We regard the low-priced and simple house shown in the illustration on this page as one of the best, cost considered, that can be designed for use on large poultry farms where ample range is afforded, or for a pen of fowls in any small enclosure. Such a house (without a board floor) can be readily moved from place to place. If we had a ten-acre orchard and forty such houses we could "house" 400 laying stock in them (giving each pen the run of a quarter of an acre), and give them such care, with a minimum of labor, that they would thrive superbly and pay big returns on the outlay.

For a floor a few inches of fresh, dry loam is good enough for us. Have the dirt floor of the house fully six inches above the surface of the ground outside the house. For roosts use ordinary trestles about fifteen to eighteen inches in height. Once a month or so take them out of doors, pour a moderate quantity of coal oil over them and set fire to them. It will be good-bye lice to those caught napping on the roosts. Locate a window 3x3 feet in the roof, south front. Be sure to run the front and back end boards up and down. Have nest boxes quite dark; this will prevent egg-eating in most cases. For the roof use foot-wide boards with grooves half an inch wide, running parallel with each edge. The water that seeps under the battens will then follow these grooves and flow off the roof. This roof being steep, will turn the water first rate. (For directions how to line a poultry house, see description of double poultry house.) Paint your poultry house as soon as it is completed, using the best oil you can afford to buy. Such a house, 8x8 feet, will do nicely for eight Asiatics (Brahmas, Cochins and Langshans), ten American fowls (Rocks and Wyandottes), or fifteen of the small breeds (Leghorns, etc.).

DOUBLE POULTRY HOUSE.

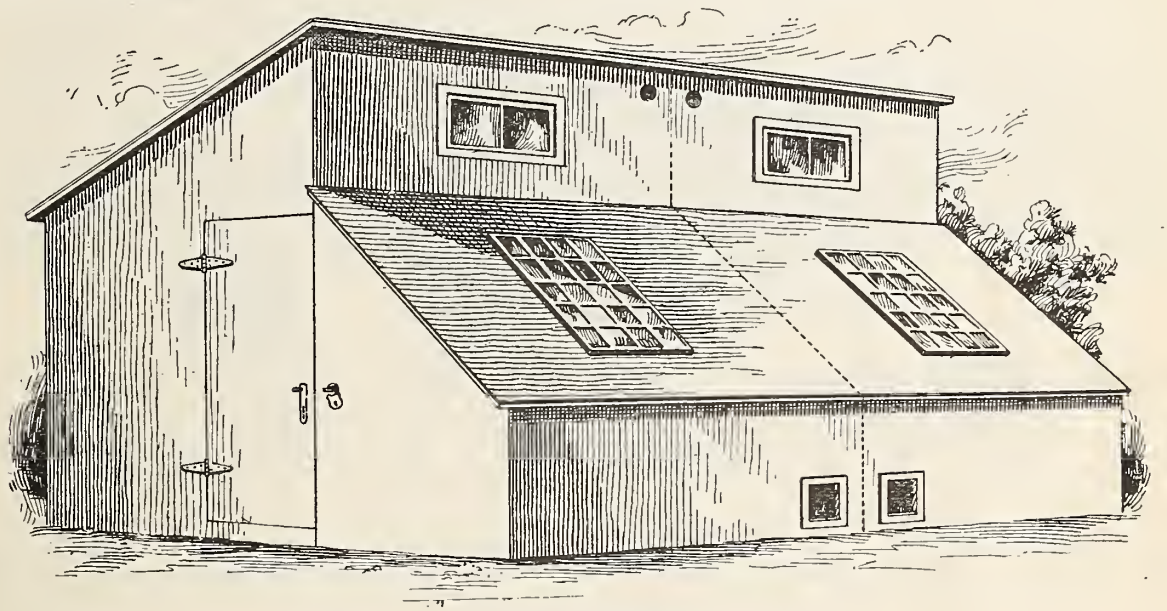
A Cheap, Substantial and Practical House—Cost, with Labor, $50.

On the opposite page is presented an original design of a cheap, substantial and practical poultry house. The illustration explains itself as to exterior construction. This is a double house, suitable for thirty fowls, fifteen in each side. The ground dimensions of the entire building are 14x20 feet. The shed proper is 8x20; the lean-to 6x20 feet. The dotted

line running up over the lean-to between the exits in front and the two round ventilator holes near the top of the shed proper, represents the position of the interior board and wire partition.

This house is four feet high at the back and seven feet high to the top of the shed. The lean-to is two feet high in front and runs up to a point five feet above the ground, where it joins the shed. There is no partition of any kind on the inside between the lean-to and the shed proper.

The interior ground space of each apartment of the house is 10x14 feet. The glass sash in the roof of the lean-to are each 3x4 feet. This is amply large. Too much glass is sure to result in dampness in the winter time, when frost forms on the inner walls at night and melts during the daytime. Whatever changes you make in the dimensions given here, do not enlarge these sash. Be sure about this. The upper windows are half sash, swung on hinges at the top so that on pleasant days they can be opened up on the inside and hooked to the ceiling.



Double Poultry House.

This house is made of one-foot wide barn siding, planed on one side. First take four pieces of 4x4 pine and place your foundation on fire brick, flat rock, or on two-foot cedar or oak posts sunk into the ground. Have the 4x4 pieces fully four inches above the surface of the ground. If you build on a flat surface or where there is any drainage toward your house, mound up the ground so that you will be sure of a dry, dirt floor. Be particular about this, as it is very important. On the 4x4 pieces placed four inches above the ground erect your poultry house. Use 2x4 stuff for the frame work. The carpenter work is not hard.

If three or four dollars is no obstacle, use shingles on your roof. They are handsome and durable. Asbestos roofing paper is fairly durable and is easily put on, but is too warm in summer. A good and cheap roof is made by buying boards, planed on one side and deeply grooved about one inch from each edge, as before described. We know of no cheaper roof that is at the same time water-proof. But shingles are best.

Line the inner walls with tarred paper, but do not line the ceiling. If you do, and the ceiling should leak, you will have serious trouble. Make your house secure from drafts and the cold will do little if any damage. Leghorns have stood twelve degrees below zero in houses constructed like this one and escaped frozen combs. Such a house as this will, in sunshiny weather, be ten or twelve degrees warmer than the temperature outside.

The two round ventilator holes open into a ventilator shaft that reaches down alongside of the partition to within six inches of the ground. When the exits are all closed for the night, or on blustering days, this arrangement prevents dangerous drafts, if the house is snugly built, as it should be.

Swing the chicken exit doors on spring hinges, hung from the top, and open and close them by means of a small rope conveniently fastened to the partition. Button these small doors at night to keep out "varmints," and padlock the big doors to bother thieves in human form. Construct the partition of boards up three feet from the ground to prevent the male birds from injuring one another, and the balance of wire mesh or lath.

A house like this that will last ten years can be built for $50, all the material from posts to paint and the labor included. We submit herewith the bill for the lumber as furnished by a Quincy dealer:

2 pieces 4x4, 14 feet long	$ 0.38
2 pieces 4x4, 20 feet long	0.54
5 pieces 2x4, 4 feet long	0.16
7 pieces 2x4, 2 feet long	0.10
4 pieces 2x4, 20 feet long	0.54
11 pieces 2x4, 8 feet long	0.59
11 pieces 2x4, 10 feet long	1.10
350 feet sheeting	4.20
3,500 shingles	8.75
300 feet one-foot wide barn siding	6.00
300 feet battens	1.80
50 feet dressed (for door, etc.)	1.00
½ sash (upper windows)	1.00
2 sash, 3x4	2.50
Total	$28.66

This provides for a shingle roof. The hardware and paint can be bought for $5. The labor can be had for $10, while the remaining $5 will pay for the tar paper and the material in the roosts and nest boxes.

The yards will be additional. Their cost will depend upon the space available and the materials used. A lath fence is cheapest; a wire mesh looks better. The bigger the yard the better, up to a reasonable size, say a quarter of an acre for twenty fowls.

After your house is completed, throw in six inches of fresh, clean soil. Pack the soil in well under the 4x4's, so as to keep out the cold winds. On top of this place four inches of clean, sweet dry straw or leaves or chaff. Five or six inches of one of these is not too much for winter-time. Make your fowls dig and scratch. For roosts use trestles, as before described, making enclosures around them out of twelve-inch boards, to prevent the droppings mixing with the straw, and to enable the attendant to clean out properly.

In localities where hailstorms do frequent damage to green-houses, a light blind should be kept handy to place over the larger sash that lie exposed. These blinds will also serve to keep out the hot sun in summer-time.

As breeding pens, this house will give excellent satisfaction. Place one male and eight females of the Asiatics in a side, one male and ten females of the American breeds, or one male and twelve females of of the Mediterranean breeds, and you will get good results from good stock. The birds will have ample room and do well.

LOW-COST, PRACTICAL FARMER'S POULTRY HOUSE.

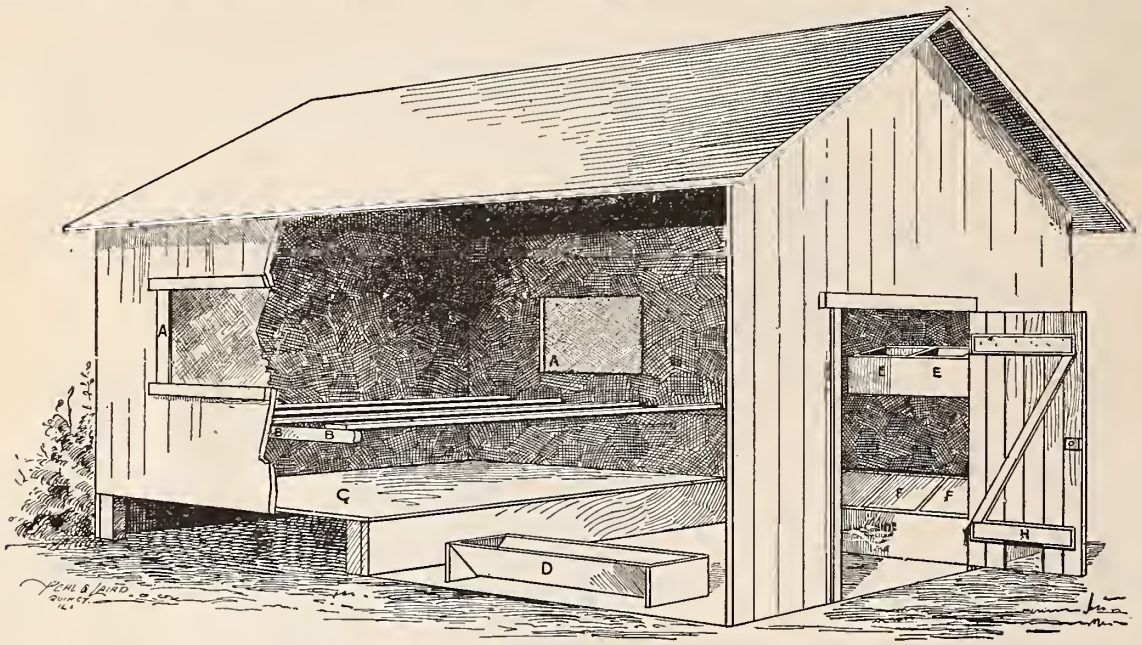
The house shown on this page taken with this brief description, explains itself. The reader will at once see how the parts of the house are made, and this house has some good features. There is nothing complicated about it, and it is such a house that the average farmer would find suited to his needs. We much prefer darkened nests to these open ones, and all roosts for a poultry house should be made movable, so that they can be taken out for treatment with coal oil or some good lice killer. The droppings board should be at least eighteen inches above the ground, so as to leave room enough for the fowls to move about underneath it and enjoy the dusting places. Instead of locating a window in both sides of the house it would be better to locate one long window or two short windows in the south front of the house, presenting a solid wall to the north and west winds. A board floor is not needed in a poultry house, though it makes it easier to clean, and where dampness prevails in the house a good tight floor with an open space underneath will overcome the dampness. Dampness in the poultry house must be fought and overcome at any cost.

POULTRY HOUSE WITH OPEN SCRATCHING SHED.

[The Double Yard System.]

Many of the most successful poultrymen in the country strongly recommend the open scratching shed plan, on behalf of the general healthfulness of the flocks, and with a view to a greater egg yield during the seasons of cold and inclement weather. We strongly favor this plan, even where a single house is to be built. For a large egg farm or breeding farm this plan is especially recommended.

Reliable Poultry Farm No. 2 has several houses that are built on this plan. Here the double yard plan is also used. Reliable Poultry Farm No. 2 (see view, diagram and etchings on this and the following pages) comprises forty acres (an old orchard) and has on it a large pond for ducks and geese. There are upwards of thirty poultry houses, twenty-eight of them arranged on the double yard plan, each pen averaging twenty fowls. Fig. No. 1, presented herewith,



Low-Cost Practical Farmers' Poultry House.

The dimensions are 10x15 feet, giving a capacity of thirty to thirty-five fowls. A A, represents the windows; B B, the roosts, built on a level; C, the droppings board; D, the feed trough; E E, the nests: F F, the feed and grit bins; H, the exit for fowls. The house should face south or east. Have droppings board fifteen to eighteen inches high, and leave opening on the outside for fowls to pass under for shelter and dust bath, as shown in illustration.

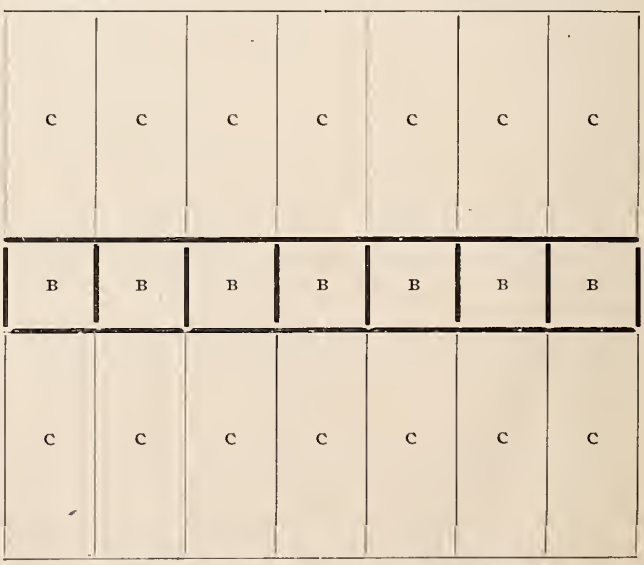


Fig. 1—Ground Plan, Showing Double Yard System.

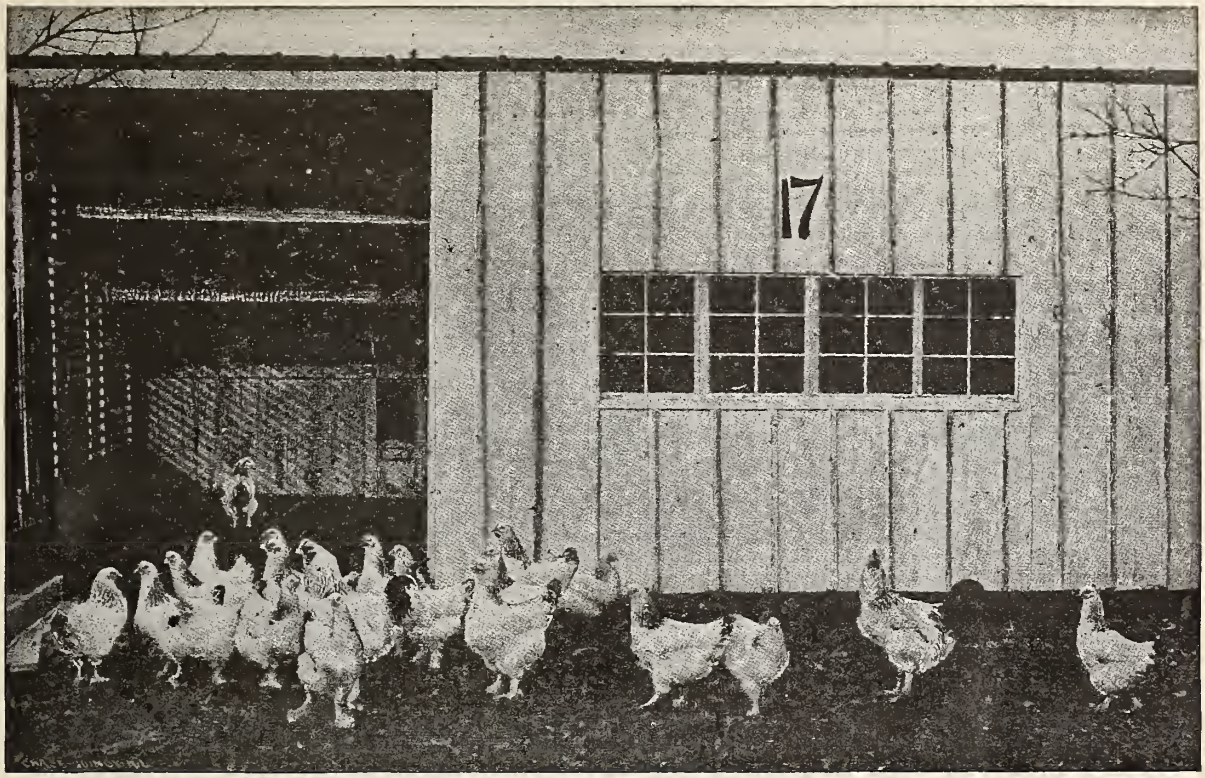


Fig. 2—Photographic View of Closed House, With Open Scratching Shed.

shows the plan. B, B, B, B, represent a continuous row of closed houses and scratching sheds running east and west and fronting south. C, C, C, C, represent the front and rear yards. Each closed house has two exits for the fowls, one opening into the front yard, the other into the rear yard. These yards are 21x150 feet and are sown in clover, rye or blue grass, some one, some another. While the fowls are feasting in one yard, the "green food" in the other is getting a fresh start. With this plan and yards of this size, there is no danger of gapes or cholera arising from the impurity of the ground. In such yards the vegetation will absorb all the impurities of the droppings. Furthermore, these fowls will have green food under foot throughout the season.

Fig. No. 2 is a photographic view of one of the closed houses on this farm, showing the open scratching shed. We regard this combination as an excellent one. The closed house is 10x14 feet, the shed 10x7. The whole affair is built of 2x4's (no heavier pieces being used), and ship-lap planed on one side. The roof consists of foot-wide boards with half-inch grooves in them an inch from each edge. Four-inch battens are nailed over each crack, and these battens extend out over the grooves. The water that seeps under the battens runs into the grooves and passes off at the eaves. The pitch of roof is steep, the front wall being eight feet high and the rear wall only three and one-half. Wire nails were used in putting on all battens, and these being clinched, hold them securely in place. Neither the closed house nor scratching shed has a board floor, nature's fresh soil being preferred. The drainage has been carefully looked after, so that water does not run toward the houses, nor stand near it. Perfect dryness is essential to healthy stock. In the winter time, also during stormy weather, the fowls take very kindly to the shelter of the scratching shed. On sun-

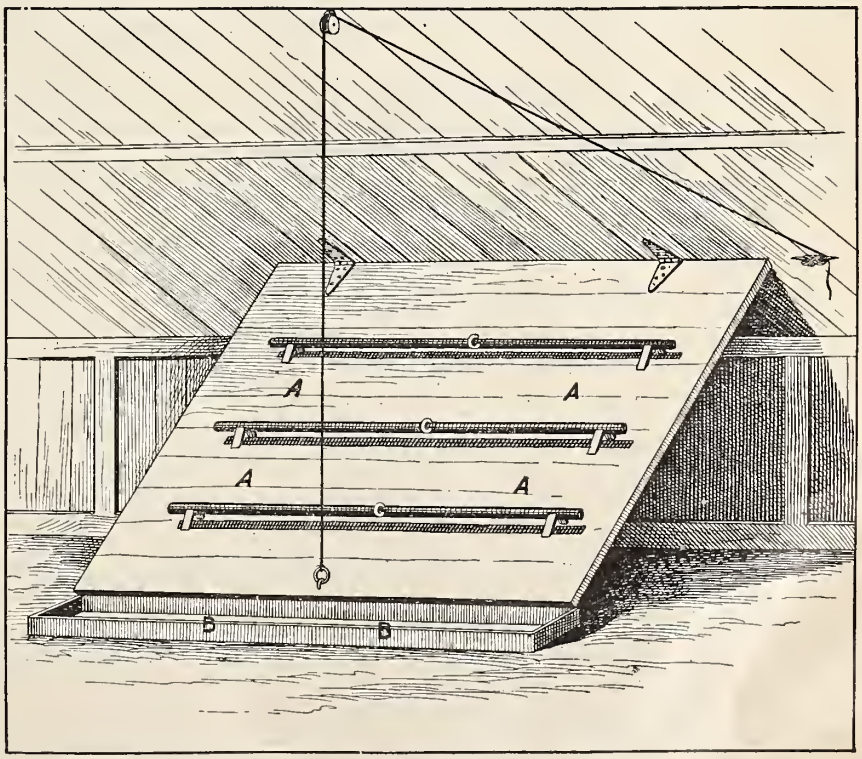


Fig. No. 3—Showing Droppings Board.

shiny days in cold weather the birds will be found wallowing under these sheds in dust and highly enjoying the warm rays of the sun. They will keep in the pink of condition and be more contented.

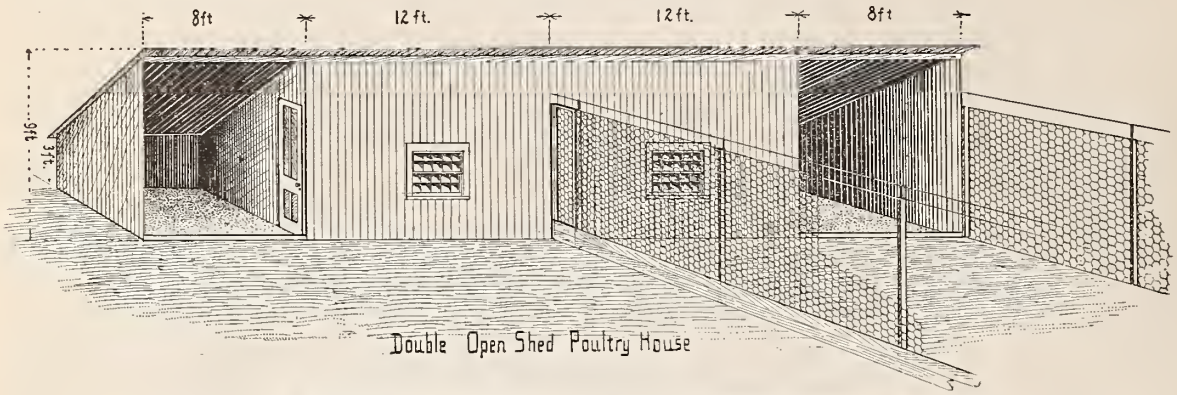
Inside the closed houses on this farm are used a style of droppings boards and nest boxes that are simple and advantageous. Sketches of them are presented herewith. Fig. 3 shows the droppings board.

It is 5x5 feet in size, see A, A, A, A. This is hinged to the ceiling, and during the day (in the winter time especially) is drawn up by means of the rope and pully, out of the way, thus giving the fowls the use of all the floor space in the house. The droppings board (B, B) is loose on the ground and can be set back against the wall, out of the way, after the droppings have been removed. C, C, C represent the roosts, which are made of 2x2 inch pieces (2x4's ripped in two), the two upper corners being rounded off with a plane or other tool. Sifting the droppings board each day with road dust keeps in check all odors and causes the droppings to find their way readily into the box at the bottom. We like this scheme very much. In winter time, when the fowls are confined, they need all the floor space they are likely to get. Besides, this arrangement is cheap and handy. Make the box B, B, only a trifle wider than the blade of an ordinary shovel and two moves or even one, will clean it out.

Fig. 4 -Representing a Simple Row of Nests.

Fig. 4 represents a simple row of nests. Two twelve or fourteen-inch boards are nailed together, forming a right angle and ends and partitions are then put in. Next nail a three-inch strip along the front, and all is complete. There is no bottom, the hens nesting and laying on a little straw placed on the ground. Set the row of nests with the back to the window of the house, so that the interior of the nests will be as dark and as little exposed as possible. If every hen's nest in the country were dark the hens would like it much better, would lay earlier, would lay more eggs, and there would be fewer egg-eating hens. The attendant places the nest boxes in such a position that when the roosting board is down the nest box is behind it, close up. In the spring and summer this board is left down and thus helps to render the nests dark and more secluded.

In coaxing hens to lay, this fact should be borne in mind: Hens do not lay eggs with the idea of filling the egg-basket. They have no such idea! Their one thought is to lay a nest full of eggs, sit on them, hatch out a brood of chicks and enjoy the blessings of motherhood. It is instinct with them. If we want eggs we should encourage this instinct by helping biddy carry it out. Try the experiment of standing some sticks of cord-wood or scraps of boards up in a shady corner of your henhouse, leaving a small opening, and placing some straw in the corner behind the sticks or boards. You will find that one-half the laying hens will find this cozy nook and lay there, rather than in the more exposed nests. Try it.



Can be Built Complete for $50 to $75 and will Accommodate 20 to 40 Fowls.

DOUBLE OPEN SHED POULTRY HOUSE.

A Mr. H. W. Sinnock, living neighbor to the editor wished to put up a suitable, low-priced house a year ago last spring, and as a result of what the writer has seen the country over, the plan here illustrated and described was recommended to him. At a cost of about $65 Mr. Sinnock now owns a number one good house with yards attached, all complete, built on the plan illustrated.

It is wise to locate a poultry house on high ground, for dryness is essential to the health of fowls. If it is necessary to scrape up a mound or ridge in order to keep surface water from draining toward the house where it will soak into it, do so, for it may be the price of your success with poultry. If the ground is flat it will answer to build the house well up from the ground, then fill in six to twelve inches of cinders or gravel (not earth), and cover this with six inches of fresh earth, which should be renewed twice a year, spring and fall. Changing this earth and keeping it reasonably free from filth and bad odors will prevent cholera and add much to the comfort and healthfulness of the flock. The cinders or gravel will insure a dry floor even on low ground where the surface drainage is in toward the house. Do not bank earth up against the outside walls. Doing so will, in two or three years' time, cause the boards to rot off.

Size of the House.

The double house shown in the illustration is forty feet long, twelve feet wide, three feet high in rear and nine in front. The closed part is divided by a board and wire partition into two pens 12x12 feet, with a door in same next to the front wall. There is no hallway, all of the room being accessible to the fowls. The partition is of boards two feet up from the earth floor (the same as he division fence), and prevents the male birds from fighting through. The upper part of the partition can be made of lath or wire netting. The netting costs a trifle more, but looks better and is not a harbor for lice. If lath are used, plane them. Lice are not "at home" on a smooth surface.

Each closed pen has an 8x12-foot open scratching shed attached—a place sheltered from the prevailing winter winds, where, on sunshiny days the fowls can scratch and bask and dust themselves and make eggs. These sheds are open to the south, and it is the practice down east, where

this style of house is popular among practical poultrymen, to provide a storm door made of oiled canvas, tacked to a light frame, which is used to close the opening of the shed. This storm door is usually hinged at the top and when not in use, is swung up against the ceiling of the open shed out of the way and safe against injury. Canvas or heavy muslin that is oiled with good paint oil is impervious to wind and water, but admits enough light to the interior of the scratching shed so the fowls can see to attend to business.

This storm door is recommended. By its use the fowls may be admitted to the shed during the day time of all ordinary winter weather, thus giving them more floor space and a place to keep busy. It will be plenty light for them, even on cloudy days.

The Materials Needed.

The sills of a poultry house like this may be of 4x4 or 4x6 pieces. If of the latter dimensions the house can be moved if desired, but the 4x4 pieces are heavy enough. These sills may be set on a rock foundation (which is best), or on two-foot cedar, oak or hickory posts. If posts are used, dig the holes twelve to eighteen inches deep, depending on how high above the surface of the ground the floor of the house is to be; place a flat rock in bottom of hole (two bricks will do if you have nothing better), and on this stand the post. A large flat rock will prevent the house from settling. If it is convenient for you to dip these posts in asbestos paint or tar, to stave off decay, so much the better.

For the frame work and rafters use 2x4 stuff. In cold climates the walls should be double, with a four-inch air space between. Ship-lap or tongued and grooved lumber, should be used for the outside wall. It is cheaper to buy for this purpose, a good grade of lumber, free from knots. For the inner wall as cheap stuff as No. 4 siding will answer, surfaced on one side, so it will take kindly to whitewash. Put the outside boards on up and down, the inside boards crosswise, which will greatly strengthen the house and render cross braces of any kind unnecessary. After the frame work is complete put on the outside wall, and make as snug a job of this as you are able, taking pains to shut out as much draft and air as possible. Now before you put on the inner wall cover the inside of the outside wall with tar paper or tarred felt. The latter is stronger and more lasting. Fit this in closely around the 2x4 pieces, with a view to shutting out every bit of draft. Use lath to hold this paper or felt in place; nail or tack heads are not large enough. In damp weather the paper will fall away from them. After a good job has been made of this important task, put on the inside wall. If thin but close fitting ceiling can be used, so much the warmer and better.

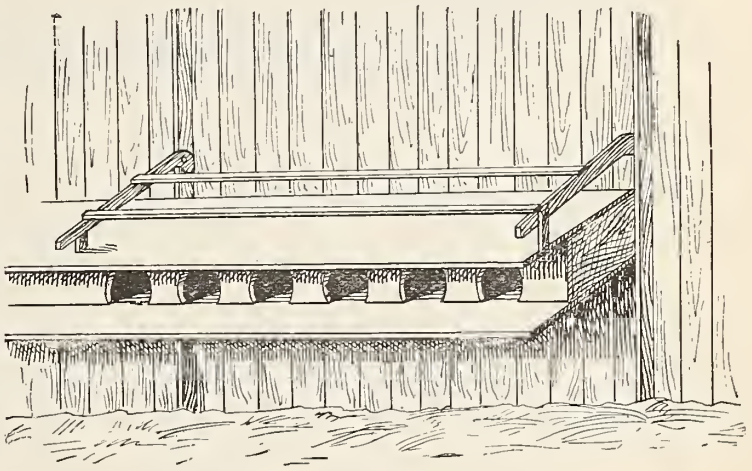
As for the roof, use shingles, buying a medium to good grade of them. Use cheap sheeting first, cover this snugly with the paper or felt, then put on the shingles. This will give you a tight, warm and lasting roof. A ceiling will not be necessary, unless the expense of making the house still warmer is not dreaded; in that case put on the same ceiling as is used for the side walls.

Moderate Sized Windows.

The windows should not be large. For 12x12 apartment two half windows put in side by side, instead of one above the other, will answer. They can be put in so as to slide to either side or be hinged at the top so as to swing outward and form an awning to keep out summer rain. But these windows should be snugly built, should close against wide enough jambs to keep out the cold and be hooked tight in the winter time. They should also be located down near the floor, the bottom sill within two feet of the floor—so that the sunlight in winter will fall on the floor, not against the rear wall or sill. Windows that are too large draw too much sun warmth during the day time and let in too much cold at night, resulting in extremes of temperature that are more hurtful than a lower mean temperature. In the far north it is a good plan to double-glaze the windows, leaving a quarter or half-inch space between the glass. The man who makes the sash for you can do this work.

The Yard Fences.

The yard fences shown in the illustration are six feet high, with a strand of fine wire four inches above the top of wire netting. A four-foot fence is sufficient for Brahmas, Cochins, Langshans or Indian Games. For the Plymouth Rocks, Wyandottes and Houdans, provide a six-foot fence; for Leghorns, Minorcas, Hamburg, etc., one higher still, up to, well, say one hundred feet. These flighty fowls will remain inside a six or eight-foot fence, provided they want to.



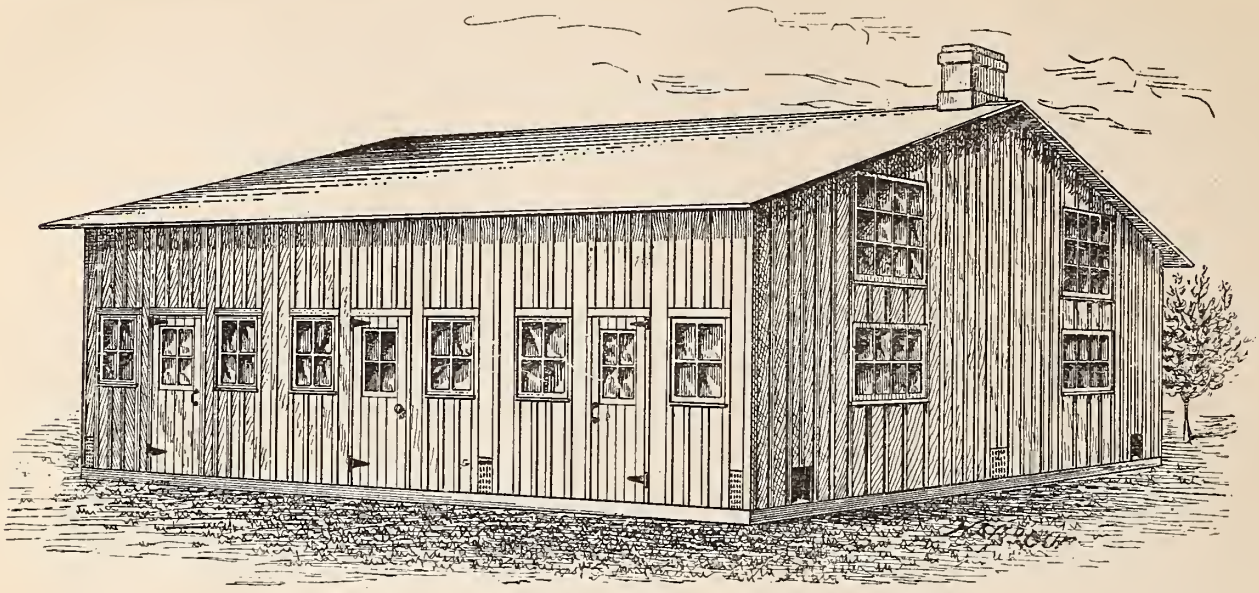
Combination Roost, Drop Board and Nests.

Here is a good combination extensively used in poultry houses in the eastern states The roosts tip up to allow easy access in cleaning droppings board. The bottom of the nests is cleated together and hinged to the wall. To clean the nests simply let down the bottom by unhooking it. Cloth curtains can be hung over the openings to nests if desired and will make the nests darker, thus preventing in a measure the habit of egg-eating.

It is largely a matter of their being contended. If changed about from yard to yard, they will fly over a barn in their efforts to get back home.

In building the fence do not provide a top rail for the fowls to alight upon. Let the upper paling that holds the netting in position be six inches below the top of the netting. Use posts that are long enough to extend twelve inches above the paling; weave a stout wire through the upper mesh of netting and stretch tight and fasten to posts to hold netting upright and in place. Then, if found necessary, stretch a thin, thread-like wire between the posts some four inches above the netting. If they do not see the thin wire it will throw them backward into the yard when they try to alight on top of the netting, or to fly the fence, aiming to just clear the netting.

If a single house, instead of a double one, with scratching shed, is desired, use only one-half of the house shown in the illustration. Gates should be conveniently placed in the fences to save steps. One next to the house is very handy, where two yards are used. If the houses are continuous, gates between the runs are a necessity and a labor-saver. If they have spring hinges all the better. Sometimes larger yards are connected with these small runs, in which case it will be an advantage to place gates between the large and small yards, as they will enable one better to change the fowls from pen to pen when necessary to do so for any purpose.



An Ideal Poultry House—Elevation.

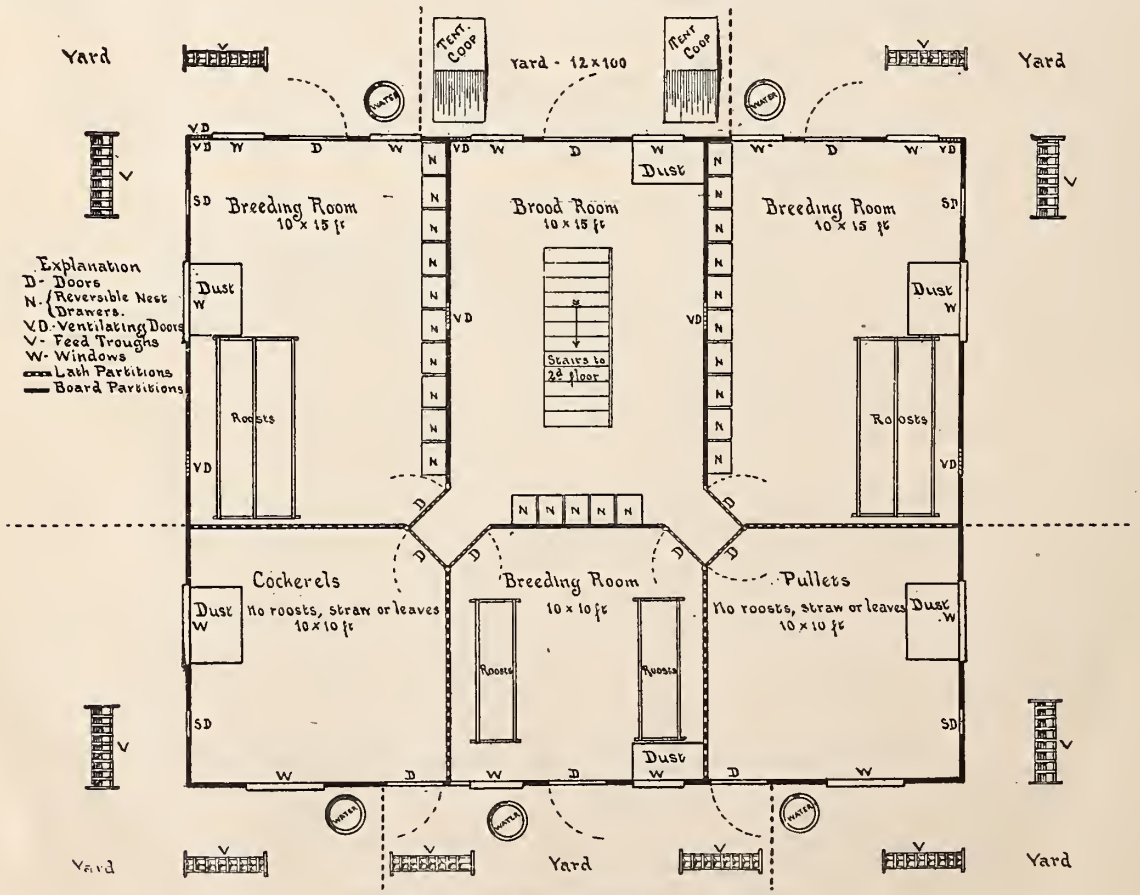
AN IDEAL POULTRY HOUSE.

Suitable for Three Breeding Pens and the "Fruits" Thereof, with Office, Shipping Room, Store Room, etc.

DESIGNED BY MRS. R. A. JUDY, BREEDER.

On this page we present an Ideal Poultry house, designed by Mrs. Judy, of Decatur, this state. Following is her description of the house:

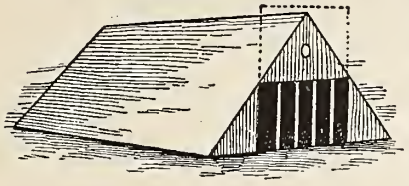
My idea is to have three breeding rooms and yards (the dotted lines entending out from the house, as shown in ground plan, represent the yard fences), with one brood room, the nest boxes to open into the breeding rooms—nest boxes to be drawers made of tin or light wood—for the hens to lay in. Then when a hen is set, draw out the drawer and reverse it, so that the open end will allow her ladyship to step out into the brood room, and the closed end will protect her from intrusion from the laying hens. [Such a drawer can easily be constructed. Simply nail a six or eight



Ground Plan of the Judy Ideal Poultry House.

inch board over the closed end.—Ed.] The brood room should open into a long lane-like yard, so that it will be easy to drive the flock in when you desire to do so. Place a row of ten coops all around the fence for the brood hens. (See illustration of tent coop.)

As soon as the chicks are old enough to "wean," separate the sexes, placing the pullets in the large room marked "pullets" and the cockerels in the room marked "cockerels."



Tent Coop.

The yards of the four corner pens should be large—all the room you can give them, up to a reasonable amount.

The wire door ventilators, north, south, east and west, should have wooden doors to close at will. I would have small doors for the fowls to pass in and out when the weather is too cold to have the large doors open. I like the large doors, however, so that the house may be as open as possible when the weather will permit. All doors should be double and all windows have wooden shutters, to slide or swing.

A stairway located in the brood room leads to the loft, where grain, shipping coops, egg baskets, canvas, twine, pails, cups, etc., are stored, and the egg record, pedigree register, egg trays, etc., are kept. Keep all eggs for hatching in a tray similar to those in an incubator, so that they can be turned as often as need be.

All roosts should be portable, so that they can be taken out, cleaned and sun dried.

Up stairs a place can be partitioned off for the young chicks hatched out in cold weather, or for incubator chicks.

This house may be cheaply built of inch boards, battened on the outside and lined on the inside with tar paper—and the very best tar paper is the cheapest in the end. All partitions may be of boards two feet from the ground, with lath or wire mesh above that, except the partitions which separate the breeding rooms from the brood room; these should be of solid boards.

The nest boxes being drawers, the eggs from the breeding pens can be gathered from the brood room. For convenience, I would have the brood room front toward the dwelling house, that one may step from the house to the brood room, having the gate from the kitchen yard open into the brood yard. This brood room can also be used as the incubator room. Small tent coops can be used up stairs, in the pullet and cockerel rooms (early in season) or patent brooders can be used indoors or outdoors.

Make the feed troughs of fence plank, planed smooth and painted. They are made V-shaped, with lath across the top, three inches apart, to keep the fowls from getting into the food with their feet. They will stand on the lath, not in the food. Yours truly, MRS. JUDY.

[This house, it will be observed, is 30x30 feet. Note the clever arrangement of the inside doors. A thoughtful inspection of the ground plan, taken with Mrs. Judy's description, will enable our readers to thoroughly comprehend this house.]

ROOST DROP BOARD AND BROOD ROOM.

We present herewith illustrations of a roost, a drop-board and a brood coop, all of which possess certain advantages.

The roost shown in Fig. 1 is made of ordinary slats an inch thick and three inches wide. This roost is suspended by the four slats from the ceiling of the poultry house, and these slats are heavy enough to hold the roost stationary when the fowls alight on it. The table or bench stands directly under the roost, is a cheap affair made of light lumber, but stout enough to handle as desired. The top is perfectly smooth and is large enough to extend about a foot beyond the roosts on all sides. The table or bench should be about two feet high and the roosts from twelve to eighteen inches above the table. If desired, the table can be made higher and the roosts still higher, where light weight fowls are to use it.

The object in making the bench larger than the roosts is to catch all the droppings and furnish a place for the

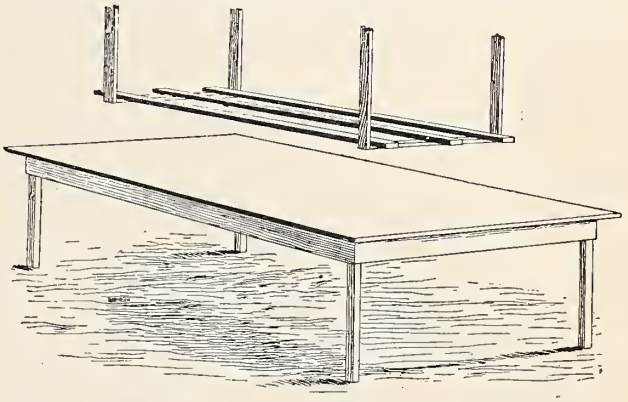


Fig. 1—Bradshaw Drop Board and Roost.

fowls to alight upon when going to roost. The droppings can be readily cleaned from such a table by the use of a hoe or a slat nailed crosswise to the end of a broom handle. Almost anything of this kind will do. The roosts can easily be painted with a view to ridding the hens of lice, and the table or bench can be taken out of doors to be cleaned, whitewashed, etc. It can also be removed when it is desired to clean out the pen, and where an arrangement of this kind is used there is no loss of floor space on account of the roosts and drop board. Taken all in all, it is one of the best arrangements we have come across.

The brood coop shown in Fig. 2 also has some points of excellence not found in most of the coops in use. It can be

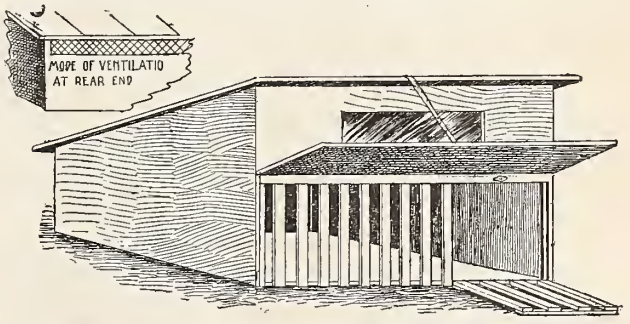


Fig. 2—Bradshaw Brood Coop for Hen and Chicks.

made any size, but two feet wide and three feet long is about right. Lumber from a half inch to an inch in thickness should be used, and the coop when completed should be painted to protect the lumber from the weather, and then whitewashed, if desired. White coops make a pretty contrast with the green sward.

The roof of this coop is made to extend over the ends and sides three or four inches, and the bottom is made separate from the rest of the coop and of a size so that the coop will set down over it clear around. The coop can then be used with or without the bottom, as desired. During dry weather and warm weather there is no need to use the bottom unless there is danger of rats, weasels or the like bur-

rowing under to get at the chicks. Pains should be taken to guard against these enemies. Where there is danger of rain the bottom shou d be used, in fact, a brood coop should be carefully located on high ground or on a ridge where there is no danger of the chicks being drowned in a sudden rain storm.

The brood coop used by Mr. Bradshaw is rat proof when shut up for the night. As shown in the illustration the inner slat door is let down, so that the hen as well as the chicks can pass in. When it is desired to confine the hen and allow the chicks egress, this slat door is closed. When night comes on and the hen and chicks are in the coop the raised solid wooden door is let down and fastened securely. Above this wooden door is a pane of glass which furnishes light on the interior of the coop when it is entirely closed up, and under the extended roof in the rear end of the coop is a strip of strong wire cloth or common window screening, which furnishes ample ventilation, but is rat proof. By the use of this coop the hen and chicks can be confined during stormy weather and will still have light to see by and good ventilation.

We do not see wherein this coop could be improved. If taken proper care of, a coop of this kind will last several years. It is small enough and light enough in weight so that it can be put away in the barn, shed or a dry cellar when not in use. Cared for in this way it will last a long time. Chicks kept in such a brooder will be safe at night and can be controlled as desired during the daytime. We recommend this coop to our readers who value their chicks and wish to preserve every one of them.

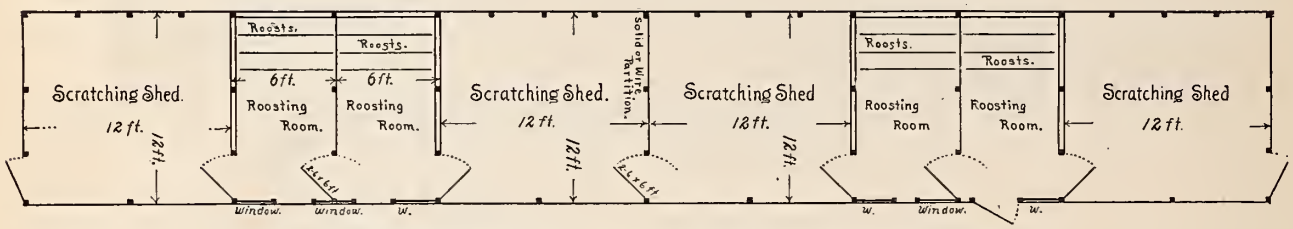


FIG. 1—Showing Ground Plan of Damp Proof Roosting Rooms and Scratching Sheds.
(See note regarding windows on Fig. 2.)

POULTRY HOUSE AND SCRATCHING SHED.

An Original Plan by which It Is Proposed to Retain the Advantages of Modern Scratching Sheds and Roosting Rooms, While Improving Them With Respect to Economy, Sunlight, and Resistance to Wind.

BY HENRY P. J. EARNSHAW.

[Written for the R. P. J.]

WHEN scratching shed houses first came into use a number of years ago they were generally accepted as all that could be desired in the way of a perfect house for a northern climate. Like all things, the longer they were in use the more their disadvantages became apparent. In recent years a number of changes have been made in the original plan with the idea of perfecting it.

That scratching sheds in this climate are highly desirable is evidenced by the number of houses of various patterns that possess this addition.

The writer has visited many plants in various parts of the country, and having discussed with proprietors the faults generally found in these houses, the matter has been carefully considered with the idea of perfecting a plan, and the outcome of the attempt is given above. I have settled upon these plans as having more advantages and fewer faults than any of the various modifications of the scratching shed house that have come to my notice.

The objections most frequently raised are: Cost of construction, time wasted in taking care of the flocks, havoc created in the scratching shed by the wind, and the time required in removing snow on certain days in winter. By using curtains this latter trouble has been overcome; but a curtain shuts out the sun, which, of course, is a great disadvantage. By adopting a sloping roof in front, strong drafts and wind in the scratching shed are overcome. In my plan the distance from floor to peak is seven feet six inches. The opening in front of scratching shed is four feet nine inches. As the wind approaches this opening the air already in the shed forms a cushion, strengthened by the resistance of the sloping front roof and the front boarding along the bottom. This prevents the entrance of strong gusts of wind. It was suggested to me some time ago while driving in a Goddard buggy against a very stiff wind. The smoke from my cigar remained within the hood, or top, with very little motion until it worked outside, when it went away with a rush.

As to cost. All that is necessary in a house for grown fowls is protection from the wind, rain and snow in the day time, and a warm roosting room at night.

The roosting room (or that part of it that contains the roosts) is the only part of the house which necessarily should be snugly and well constructed. This should be double boarded and lined with waterproof felt both inside and

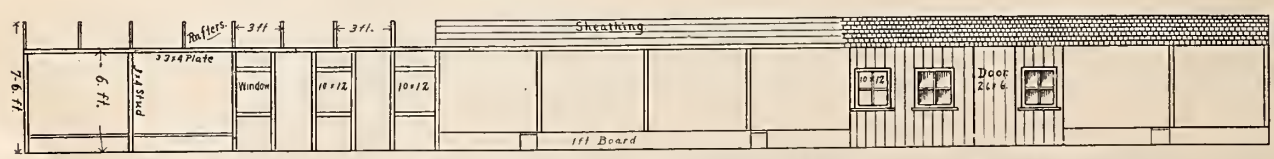


FIG. 2—Showing Front Elevation, Part of Which is Shown Complete, the Remainder Showing Mode of Framing.

[NOTE.—The middle window is incorrectly placed in the finished portion. It should be midway between the east and west windows, as shown in the plan of frame work. The windows, too, are larger than in illustration. Size of window about 2 feet 6 inches square.]

KEY TO CONSTRUCTION OF WINDOW—(See Figs. 5 and 6.)

A—Window sill. B—Strip nailed on sill to prevent sash E from slipping off, and to hold sash tight to outside wall. C—Block nailed to studding on each side of window to hold top of sash F when in place. D—Space below sill into which sash drops when open. E—Sash. F—Sash. G—Inside stop. H—Outside boxing projecting three-fourth inch over edge of studding to hold sash in when window is closed.

outside. As the roosts are placed at the rear of the house, they are away from doors and windows and are therefore free from drafts. During very cold weather a curtain of burlap can be hung from the ceiling to a level with the dropping board. This will retain the heat and yet give all the ventilation necessary. In such case the fowls are protected by their own warmth from the outside temperature and do not warm up any more space than is absolutely necessary, and as soon as it is light they make their way to the front of the roosting room and get such exercise as they desire until the attendant comes and feeds them and raises the curtain.

After a long cold night it is desirable to get the first morning sun. For this reason the windows are arranged respectively on the extreme east and west ends of adjoining roosting rooms and one between the two rooms giving light to both. By this arrangement the sun, as soon as it rises, throws its light on almost one-fourth of the floor space of both roosting rooms. The late afternoon sun does the same. It increases the sun in the house one-half hour in the morning and one-half hour in the afternoon, or an hour in all, which makes a great difference on a cold winter day. During the shortest day in winter every part of the house catches the sun at some time during the day.

Windows in roosting rooms should be opened on all sunny days as soon as the sun is well up and closed two or three hours before it goes down.

The minor details of the house can be arranged in any way that is agreeable to the user. If it is desirable to have an enclosed scratching shed it will be best to increase the height of the house to eight feet at peak and six feet six inches at the front. This enables one to fold the front shutters back to the roof, which is so high that they will not interfere with the swinging of the doors. I do not consider it advisable to alter the height of the back wall unless the attendant is more than the average height, in which case it might be inconvenient to do the work.

The house should be built on ground with sufficient slope to carry away surface water. Face it a little to the east of south. If it faces this way you will get the greatest possible amount of sun and will not catch raking winds from either the east or the west. The house should be situated on naturally dry land.

Exterior Construction.

For the foundation place flat stones under the sills in place of posts, or posts can be sunk in the ground and cut off eight inches above the surface. If posts are used they should be at least six inches in diameter. By stripping off the bark and charring the part to be placed in the ground, or by covering it with a heavy coating of tar, the life of a post can be greatly prolonged.

The frame should consist of not less than three by four inch studding, and where there is liability of heavy snow storms it is as well to use two by six-inch stuff for the roofing timbers, as this will not sag. Be careful to use sound timbers where there is much strain, such as on plates on front of scratching shed, using the knotty pieces for uprights in framing back wall.

Use any kind of boards for the walls, provided they are of an even thickness, for covering in, with the exception of the back part of the roosting room. This boarding should be of matched stuff and should be laid as close together as possible.

There is a variety of roofings to choose from, and as they all have merit, and none of them is perfect, I will discuss them in a general way and let you make your own selection.

Iron roofing is usually too expensive for this use and is really not suitable for the purpose, as it is very cold in winter and draws the heat in summer. If it is used it should be painted on the under side with a good iron oxide paint before laying, and should be coated at least once every two years on the weather side with similar material. With the best of care it will not be permanent, but will rust from underneath.

Shingles make a very good and permanent roof and require little care until they begin to wear, when it is best to tear them off and replace with new ones. If shingles are to be used, it is well to lay rosin sized building paper under them to keep the wind out. Never paint shingles on a roof after they are laid, as it shortens their life. The moisture works down between the cracks and under the shingles and if painted it remains there for a long time drying out slowly, with the result that they decay quickly. If a shingle is to be painted or stained the best way is to dip it before putting it on. If this is done, there is no unprotected side for the water to soak into.

Felt roofings are the cheapest usually in first cost, but require coating every two or three years. They usually cost more in the long run than shingles and are never as satisfactory.

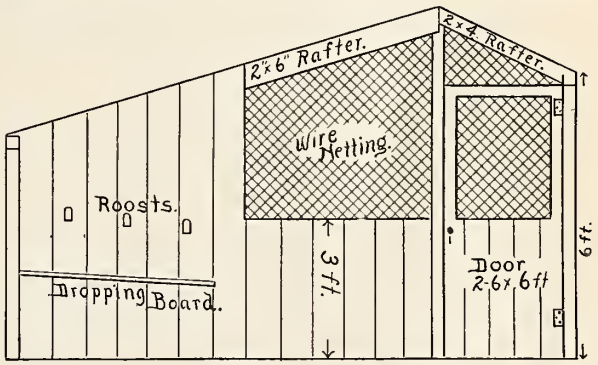


FIG. 3—Showing Partition Between Roosting Rooms, and Position of Roosts.

Paper roofings are usually all right, provided they are battened down well to keep the wind from tearing them and by keeping them well painted. Never use a paint on a paper or felt roof unless you know its ingredients. Certain chemicals are used in roofing paints that do not always work well with the chemicals in the paper, so it is well to write the manufacturer and find out what paint or coating he advises used on his particular roof. All ready roofings, like incubators, should be used according to instructions. The manufacturers know more about them than you do. Many a roofing has been abused because some paint or coating had been used on it that rotted it out. In laying shingles it is not advisable to use wire nails, as they do not last, but rust off. Neither should tarred paper be laid under shingles, as it rusts the nails and shingles fall off.

Whatever roofing you use it is well to lay a layer of rosin sized sheeting under it so that the expansion and contraction of the boards will not wear directly on the roofing itself.

Where ready roofing is used for covering the sides it is not necessary to lay paper under it, but it is well to batten it well, being sure to paint under the battens to prevent rotting.

A good way to lay a ready roofing is to continue the siding over the eaves.

This makes a perfectly tight joint at the eaves and prevents any draft from striking through.

Interior Construction.

Board up the inside of roosting room, the whole width of the rear wall, and about four feet six inches of the

partitions, with matched stuff, and fit strips of board in at the end of boarding and roof, making a tight air space. This is necessary to keep moisture out of the space and from working into the boarding. When this is done line the interior of the roosting compartment with a water-proof felt or paper, being careful to make all joints tight. This is the most important part of all in making it frost proof. It is necessary to keep this water proof as well as the roof, for reasons stated below. If an extra warm house is wanted it is well to use Cabot's sheathing quilt under the water proof lining of this roosting compartment. This is the best cheap non-conductor that I know of. Do not fill the air space with anything that will be a harbor for rats. Sawdust, if it is absolutely dry, is all right, but if it is damp it will rot out the boarding. There is nothing that I know of suitable for this purpose that can be had at a price that would warrant its use.

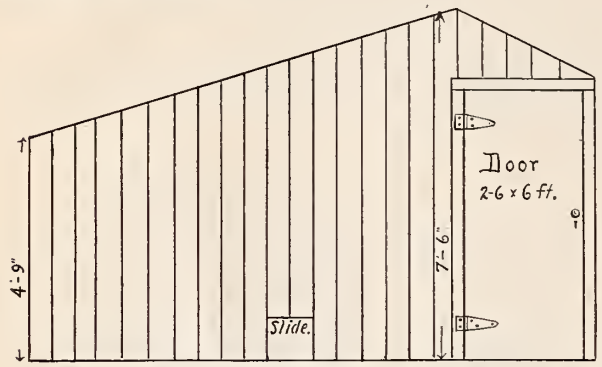


FIG. 4—Showing Solid Partition Between Roosting Room and Scratching Shed.

The curtain for use in front of fowls can be made of burlap tacked onto two strips of board or anything handy. One by one inch is large enough. When the curtain is put up in the fall simply put a nail in either end and drive it into the ceiling half way. It will then be an easy matter to remove in the spring to be stored for further use. The strip on the bottom will make it hang flat. A string can be tied through the center of this bottom strip to attach to the under side of roof with which to raise it out of the way in the day time.

Windows are intended to be hung the same as those in general use on street cars. That is, lifting slightly, pulling towards you and sliding down. If the front of house is made six feet six inches high, they can be hinged at the top and swung in to the roof, so as not to interfere with the doors. In this case the middle window will have to be permanent..

By leaving a space for water vessels in the solid part of the partition between the roosting rooms one water vessel will serve for two flocks.

The reason for lining roosting compartments with water proof paper is to prevent condensation on the boards. There is probably nothing in connection with a poultry house that has bothered poultrymen to the extent that dripping walls and ceilings have, and at the same time there is nothing so little understood. I will try to give the cause in as few words as possible, and you will readily see how it can be prevented.

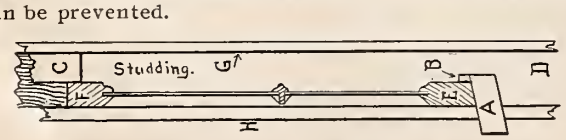


FIG. 5—Showing Construction of Window with Sash in Place.

All air contains moisture. The warmer the air the more moisture it can hold. Moisture is a good conductor of cold.

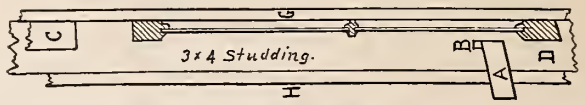


FIG. 6—Showing Construction of Window With Sash in act of Dropping in Space D Below Sill.

The moisture contained in the fowl's breath is absorbed by the air in the room. This air is in constant circulation, caused by the different temperatures within the room and the air leaking in from the outside. As the fowls keep on breathing the air becomes more charged with moisture. Now this air coming in contact with the colder surfaces condenses, leaving its moisture. If this surface is not water proof, the moisture will penetrate and, being a good conductor of cold, will allow the cold to penetrate the walls much more quickly than when dry. The minimum temperature at which air contains the greatest amount of moisture is called the dew point. As air can contain more moisture at a high temperature than at a low, it will be seen that the dew point will be reached much sooner on a cold night than a warm night, and that by waterproofing the roosting compartment of the house should the dew point be reached on a few occasions the moisture can not penetrate the boarding and thus injure the efficiency of the partitions. To have my house warm in winter I would prefer to waterproof the inside walls than the outside if I could not afford to do both.

Should be glad to answer any questions in regard to any points in this plan of house that are not made clear.

NEST BOXES TO PREVENT EGG-EATING.

We call attention to the design for nests, see Fig. 1, which is well calculated to prevent hens from getting into the annoying habit of egg-eating. Dark, shallow nests are the best and most practical preventive known, and the plan of building such nests as shown in the illustration is a good one. As to size, build the nests according to the size of the hens. If intended for Leghorns or medium-sized hens' nests, 12x12 inches will do; if for Brahmas, Cochins, etc., do not fail to have the nests 15x15 inches in size. Be governed also in the height of the nests by the size of the fowls. Seven to eight inches will do for Leghorns; while for the big breeds they will need to be ten inches high. Fill in enough nest material so that the hens can only creep on and off the nest, without being able to stand up in them and get at the eggs to eat them.

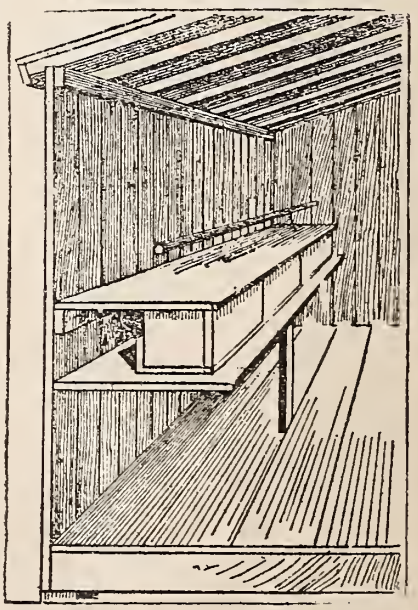


Fig. 1—Nest Boxes to Prevent Egg Eating.

These nests, built as in illustration, will be quite dark. This will tend to prevent the hens turning, after they get off the nest, and contracting the habit of eating their eggs.

The bottom board of this row of nests should also be

hinged to the wall of the poultry house, so as to open downward, thus rendering it easy to clean them out. The upright which holds the bottom board in position is also on a hinge, attached to the bottom board. To let down the bottom, kick the upright from under it. This bottom board extends ten or twelve inches all around the box, furnishing a place for the fowls to alight on when going to the nests, or to roost. The roost pole or poles (two can be used) may be seen above the top of the nests. This top serves as the droppings board and should be built on an incline and also hung on hinges against the wall. It can then be raised to get the eggs from the nests.

During the time of year when the poultry house is closed up it is a good plan to carry away the droppings every day. To do this is a very simple matter where such nests and roosts as this one are used. Save the droppings for use as a fertilizer and have some slacked lime or dry earth (lime preferred) at hand to sift on the droppings board after each cleaning.

Be careful about feeding egg-shells to laying hens. Your mother's plan of drying them to a crisp in the oven, then crumbling them fine, was the safe way. Mixing them in with the morning mash is the wise thing to do. Throwing fresh egg-shells out for the hens to eat, with, perhaps, some of the raw contents hanging to the shells, is a pretty sure way to work up an appetite that will result in wholesale egg-eating.

Another thing that leads up to this habit is high nests with nothing in them but coarse straw. This straw the broody hen works toward the side of the nest, leaving bare the board bottom. An egg falling on this hard surface is broken, the contents running out. The next hen to come to that nest to lay sees the broken egg, is attracted by some part of it, picks into it, likes it, eats it up—and the mischief is done. Soon she will break eggs with her beak. Other hens will join her, get a taste, like it, want more—and go and do likewise. Shallow and darkened nests help prevent these things; hence their value. For nest material put half an inch or more of fresh earth in first, then chaff or lawn clippings. The board bottom will not then become exposed.

MODEL BROODING HOUSES.

Several Styles of Practical Brood Houses Designed to Suit Poultry Plants of All Sizes—Information on the Handling of Chicks in These Houses.

WE STATE with emphasis that the broiler or market poultry business is not a delusion and a snare, as many seem inclined to believe; it is really a field of profitable and safe investment. The fact that men who are wholly unsuited to the poultry business in any of its branches have rushed pell-mell into the "broiler business" and made total failures, is not proof that there is no money in broilers. We know that there is good money to be made in this branch of poultry raising; this fact has been clearly demonstrated on hundreds of successful chicken and duck farms. We firmly believe that the broiler business is destined to be one of the most profitable in the list. There is something still to be learned (there always will be), but the demand exists, the appliances are at hand, and active brains are at work solving the problem of success.

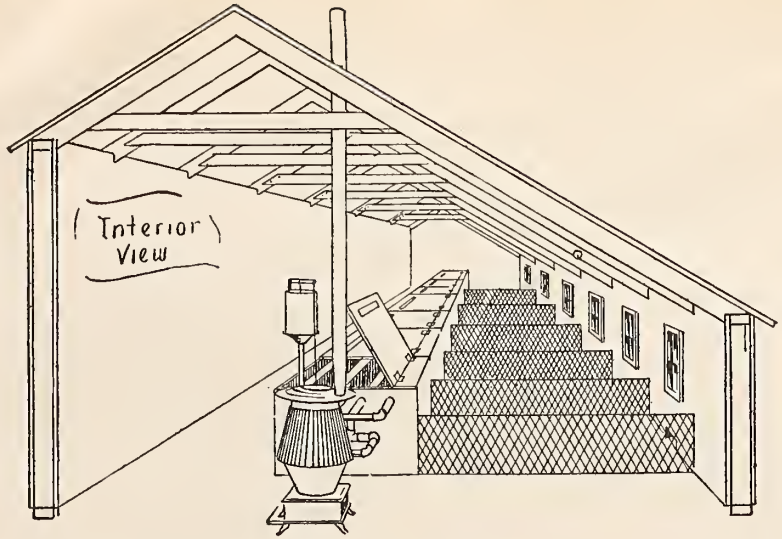
A sample of why some people fail to succeed in the broiler business came to our personal notice this fall. A Hungarian from Chicago visited Quincy to buy one hundred Barred Plymouth Rock laying hens. He wanted us to agree to furnish him the hundred hens, and to contract that by the tenth day after they reached their Chicago quarters fifty of them would be laying. We told him that it would be impossible for us to fulfill such a contract. This man, five months before he came to Quincy, had no thought of going into the poultry business. At this time, however, he had $2,500 invested, and was rapidly getting afraid of his own shadow. The fact that he thought that any one could furnish him with one hundred hens in the midst of the molting season, fifty of which would lay within ten days after being shipped 260 miles away, and being placed in strange quarters, in strange hands, showed how very little he knew about the disposition and habits of poultry.

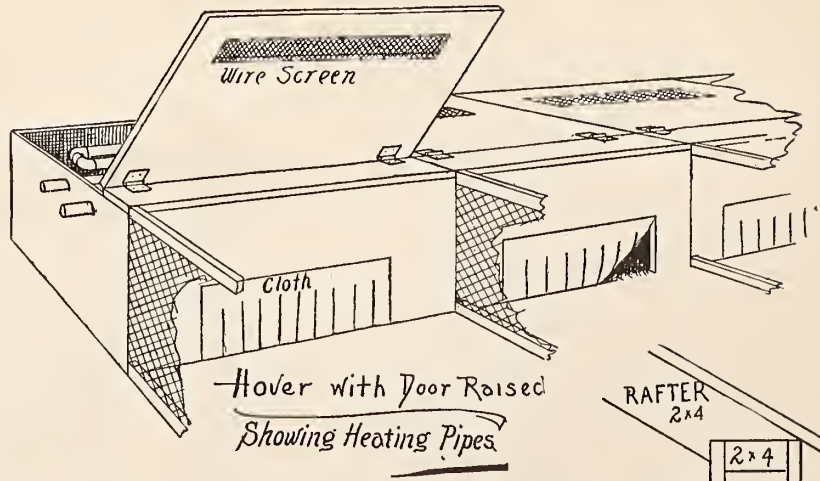
Another man wrote us in August of 1893, saying that he proposed to engage in the broiler business on a large scale; that he had ample capital and was confident of success. Then he asked if it would not be a good scheme to buy up a few thousand fresh eggs at August prices and save them until the following January and February for hatching purposes.

In view of such cases as the above, and the well-known fact that in ordinary mercantile pursuits over 90 per cent of those who embark fail to succeed, it is not at all surprising that a good many of those who go hastily into the broiler business meet with failure. If a person has not a natural liking for poultry, if he is not pains-taking, economical and persistent, he will not succeed in this business, not to a satisfactory extent. In this day and generation, when competition is so great, a man to succeed in almost any business must stick to it closely, employ the best appliances and watch every point.

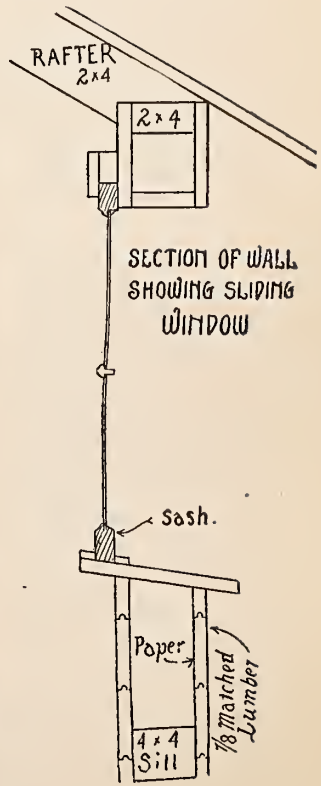
We advise those who think of going into the broiler business, who have had little or no experience with poultry, to go slow; to buy one or two incubators and brooders and learn how to use them with good results before buying a dozen. Spend a year in experimenting, if need be. This is straight, honest advice. There is no great hurry. You can depend upon it that the demand for broilers will be as great next year as it is now. America will never consume less poultry and eggs than she is now consuming. We are sure of this. Our people, in proportion to population, do not to-day consume one-half as much of these foods as do the European nations. Our population is rapidly increasing, our cities are growing at a surprising rate—more and more poultry and eggs will be demanded as the years go by.

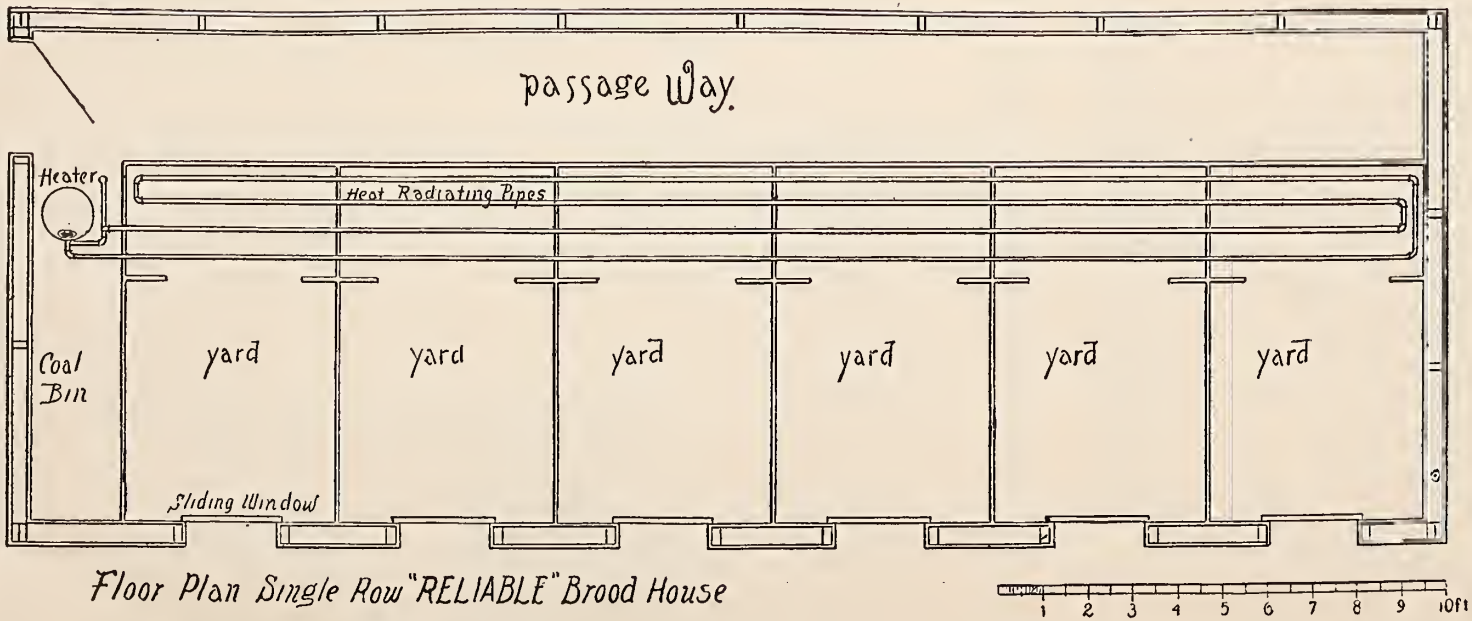
We insert here an extract from a report of our trip east, made during the summer of 1898, touching on the broiler business: "Mr. Thomas Allen, one of the proprietors of the Lynnhurst Poultry Yards, began as a boy years ago to buy common poultry and eggs for market, going from farm house to farm house. He kept branching





Hover with Door Raised
Showing Heating Pipes





Floor Plan Single Row "RELIABLE" Brood House

DESIGNED BY

Reliable Incubator & Brooder Company Quincy Ill

out until now he buys and ships to the Philadelphia and New York markets $150,000 to $175,000 worth of poultry and eggs each year. He stated that probably his business in this line will reach $185,000 this year. He buys practically all of this amount within a radius of twelve miles of Glassboro, so it may be seen that this is quite a poultry raising section. He has men with wagons who make regular trips out through the country.

On July 6, which is late in the season, Mr. Allen was paying ten cents per pound for young ducks and twenty-one and twenty-two cents per pound for spring chickens—the larger the better. "The duck market," said he, "is being overstocked this year here in the east. The price for ducks is now lower than I have ever known it to be, while the demand for choice spring chickens at good prices has been away beyond the supply. There is good money in spring chickens at the present prices."

"Capons pay well." continued Mr. Allen. "They bring twenty cents a pound from Thanksgiving to April 1, then range down to fifteen cents. I bought five hundred from one man this spring. The largest pair I have bought this season weighed twenty-eight pounds, and I paid the owner twenty cents per pound for them. Capons should be marketed when from seven to twelve months old.

"I do all I can to encourage farmers and farmers' wives to raise better stock each year, to improve its size and appearance when dressed by using standard-bred males with their flocks. They have done this until I am now able to buy much choicer dressed poultry and to get top prices for it. I buy it all dressed and aim at the top of the market. As a matter of fact poultry is the best paying crop raised in this section. There is no doubt that it pays better than any other crop marketed. Many people have found this out and others will.

"Last year I bought five hundred and seven tons of dressed poultry, all within a radius of twelve miles of Glassboro. Farmers' wives raised the most of it. Now and then you will find a farmer who turns in and helps, but the women in this section raise most of the poultry.

"I like Wyandottes best for early fries, for broiling, but for five and eight-pound roasters, the Cochins, or crosses of the Cochins are the best and tenderest. The introduction of Asiatics has increased the weight of market poultry in this section from two to three pounds per head. A cross of Light Brahmas and White Plymouth Rocks makes a fine roaster. I constantly advise farmers to buy big, vigorous, thoroughbred males to put with their common hens, and they are doing it. Those who do this and take pains soon find their poultry to be the best paying crop they raise."

If you know very little about handling poultry, begin on a small scale. Build a brooding house that will hold 500 chicks (or even 200), but build it so that it can be added to from year to year. Any properly constructed brooding house can be built part at a time. Think twice, think several times, before you take a step forward. Feel your way. This is the great secret of success. Advice is cheap. Experience costs dearly, but is generally worth the price. Save on experience by accepting good advice.

The next few years will witness the development in the west, northwest and south of dozens of large broiler farms and scores of small ones. The best and most successful of these will be combination farms. They will combine thoroughbred poultry with market poultry, and will give close attention to egg production and the raising of broilers, roasters and capons. By this combination a substantial, lasting and profitable business can be built up.

An inviting feature of the poultry business is the fact that a man or woman can begin at the bottom, with a small amount of capital, and by proper effort work up a big and paying business. There is apparently no limit to this business. No one has ever yet reached a limit. There are farms down east with capacities ranging from 10,000 to 20,000 chickens and ducklings per year, but these men do not pretend that they have reached the limit of profitable investment.

SINGLE ROW RELIABLE BROODING HOUSE.

On page 38 are presented drawings of the Single Row Reliable Brooding House, a house that embodies the best ideas to date for a single row house. This house can be built in any length, the usual width being twelve to sixteen feet, sixteen feet preferred. This gives room for a four-foot aisle along the rear wall of the house, for brooders two and a half feet in width and for inside yards or runs nine and a half feet in length. These inside runs can be built on the plan of the Hammonton brooding house shown herewith, that is, the yards to be increased in size to accommodate the chicks as they grow larger, or the number of chicks can be reduced. The latter is perhaps the easier plan, for then the brooders are all of the same length, but either plan can be used as desired.

If a long brooding house is built a double heater with pipes extending both ways should be used for this places the heater mid-way of the house, thus bringing the source of heat nearer to the pens located in the ends of the house farthest from the heater. Where a short house is built, say one of fifty feet or less in length, a heater with pipes extending from one side only will do very well. If a house one hundred feet long is built, by all means locate the heater in the middle of the house.

A pit should be dug fifteen to eighteen inches deep for the location of the heater. Make this pit large enough so that the heater can be taken care of conveniently, and the coal pit or bin should be located back of the heater and within easy reach of it. The Reliable Incubator and Brooder Company furnish these heaters separate, or with complete piping outfit, as desired. If you are located in a large city where first-class plumbing can be had at a reasonable price, it may be as well for you to buy piping near at home and save freight charges, though the freight charges on material of this class are not excessive. We think, as a rule, it is better to buy a heater and piping complete with full directions in the shape of blue prints for setting up, building the brooders and operating same. The Reliable Company furnish blue prints and full instructions for building and operating both the single row and double row Reliable brooding houses. Where their plans are followed, they assume the responsibility of proper fittings, etc., which, as a rule, more than offsets the freight charges, for they know what they are about in this particular line, while the ordinary plumber may be at fault.

Any good carpenter might, by studying the plans shown on page 38 and consulting the following bill of material, build this single row brood house without making a mistake. It is really a simple affair, but should be well built and snugly built to preserve the heat and keep out the cold. Brood houses like the two illustrated herewith are extensively used by the successful duck and broiler raisers of the east:

Bill of Material for Single Row Reliable Brood House—No. 4.

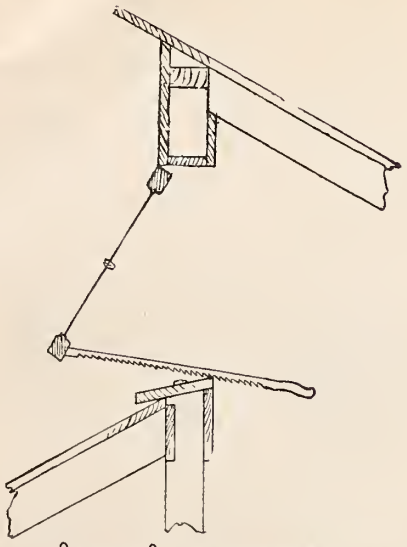
4	4x4	16 foot sills.
2	4x4	12 foot sills.
9	2x4	7-10 long side.

Double Row Reliable Brooding House

DESIGNED BY

Reliable Incubator & Brooder Co.

Quincy Ill.

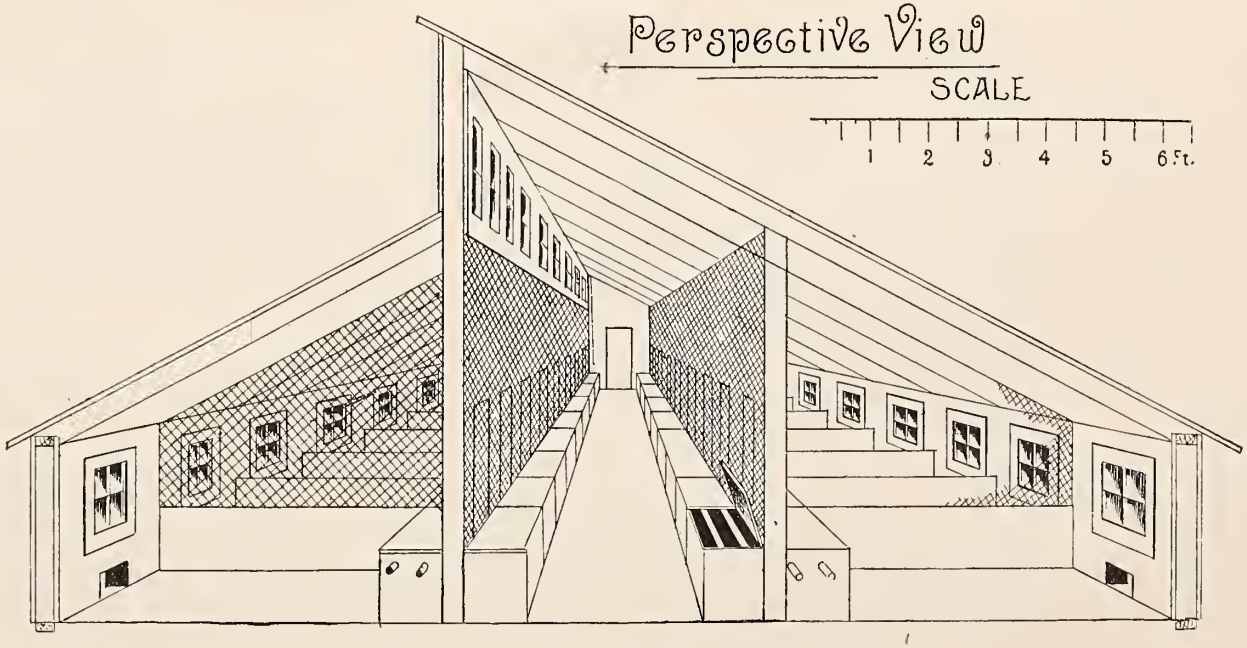


WINDOW AT GABLE TO SWING

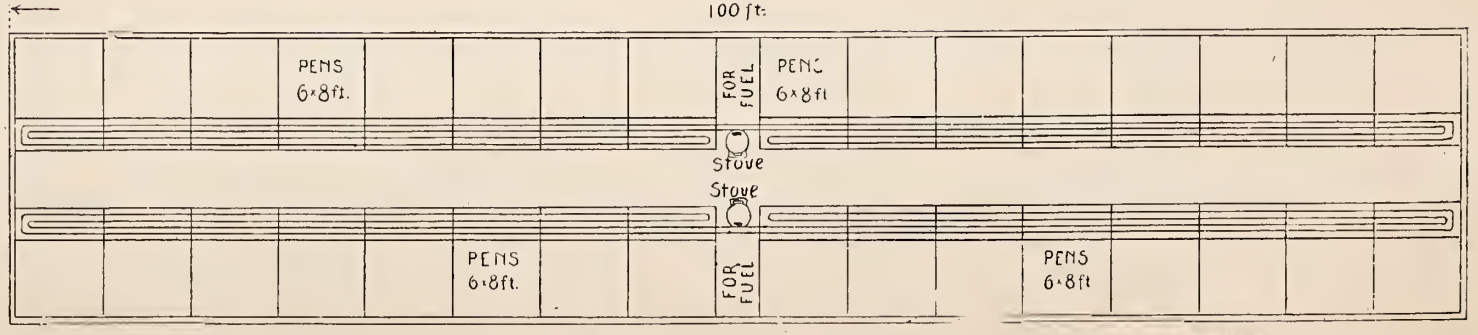
Perspective View

SCALE

1 2 3 4 5 6 Ft.



Bill of Lumber		
15	4×4	16ft Sills
6	4×4	12 "
3	4×4	14 "
18	2×4	10 " Center Stud.
15	2×4	12 " Side "
30	2×4	16 " Plates & "
12	2×4	14 " "
36	2×4	16 " Rafters
36	2×4	9 " "



FLOOR PLAN

SCALE

5 10 15 20ft

14	2x4	3-10 short side.
17	2x4	12 foot rafters.
17	2x4	5 foot rafters.
5	2x4	7 foot end studs.
15	1x4	8 foot collar beams.
6	2x4	6 foot partition for wire.
5	2x4	16 foot plates.

Sixteen posts set in ground, 560 feet 8 feet wide matched, 618 feet 12 feet wide matched, 100 feet 12 inch stock for casing, 650 feet sheeting, 5,250 shingles, six windows, sash 2 feet 6 inches wide, 32 inches high, 84 feet stock for pens, 212 feet 12 inch stock for brooder, 32 feet six inches dressed fence for ridge boards, 7 pair 4 inch strap hinges, 6 pair spring hinges for chicken doors, 25 pounds 20 spikes, 50 pounds 8 common nails, 24 pounds 4 penny nails, 10 pounds 8 finish nails, 1 gross No. 7 1¼ screws for doors on brooder, 2 pounds wrought nails, 36 lineal feet wire netting 2 feet wide, 1,350 feet paper.

DOUBLE ROW RELIABLE BROODING HOUSE.

This double row Reliable brooding house, as illustrated and described on page 40, is, we believe, an entirely original production of the Reliable Company. It combines a number of features found in no other style of brooding house and has several advantages that make it extra valuable. The row of gable windows fronting south permits the sunlight to fall into the north or rear row of pens during the winter time when the sun swings low in the heavens, while in the summer time, when the sun is high, the four-inch casings to these windows cut off every bit of sunlight from the interior. It is in the winter time that sunlight is so essential to the health and comfort of the chicks, and at this season of the year both rows of pens are taken care of in this respect.

By locating the brooders half way in the aisle and half way in the pens, with hinged lid doors opening from the aisle, the chicks can be put into the brooders and the brooders cleaned out without going into the pens. A house built after this style, that is 100 feet long, is equivalent to a single row house 200 feet long, but is much more compact, is easier to keep warm and of a uniform temperature. A house of this style that is 100 feet long should have two stoves, one to heat the piping system on each side of the aisle, and these stoves, when located midway of the building, will keep the general temperature moderately warm, in fact, drums can be put on the stoves if desired, or common stove pipe can be conducted the length of the house, one going in one direction, the other in the other direction, thus utilizing practically every bit of heat that comes from the fuel. Two stoves with drums or stove pipes as suggested operated in a house of this style, that is warmly built, will keep the temperature up to 60 or 70 degrees in ordinary weather, and this will give an ideal place for brooder chicks.

The youngest chicks should always be placed in the pens next to the stoves, or nearest to the source of heat, and this will also place them in the warmest part of the building. The south and north walls of this building are to be only three feet or three and a half feet high under the eaves, are to be double, with a four-inch air space between, the outer wall to be lined on the inside with building paper or tarred felt.

The house foundations measure 100x20 feet, inside measurement. This allows a passageway four feet in width, and leaves space for forty pens 5x8 feet, twenty on each side of the aisle. Allowing one hundred chicks to the pen until they are three weeks old; seventy-five to the pen when they are between the ages of three and six weeks, and fifty to a pen after six weeks, or an average of seventy-five to a pen, this house is calculated to accommodate 3,000 chicks.

The foundations consist of 4x6 pieces, resting on the tops of 4x4 red cedar posts that are two feet long and sunk into the ground a distance of twenty-two inches on an average—the ground being nearly level. At no point do the 4x6 pieces rest on the soil. The floor of the house is covered with three to four inches of sand and fine, screened creek gravel, and it is this dry gravel and not the surface soil that comes in contact with the sills.

Pieces 2x6 are used to support the large roof, the uprights all being of 2x4 stuff. It is hardly necessary to go into such details as these, as any carpenter and builder should know what sort of lumber is required for such a building, so far, at least, as its strength is concerned. The sides of our house are made of No. 2 tongued and grooved lumber, planed on one side.

Both roofs should be shingled, the sheeting to be put on first, close together, building paper or tarred felt to be put on over this and then the shingles put on with four inches exposed to the weather, which will insure a warm roof. Of course the building can also be sealed overhead if desired, leaving a four or six-inch air space, which will make it extra warm. It pays to build a brooding house so as to have it plenty warm. It will save more than enough fuel to pay a handsome interest on the extra investment and will save in labor and in loss of chicks as long as the house is used.

The windows (forty of them) are all of the same size, 20x40. The house faces to the south. All the windows are hung from the top and are made to open outward, so that if left open during a rain storm the rain will not beat in.

The rear section of this house is four feet wider than the forward section, the four-foot passageway being entirely under the rear roof. The supports of the roof of the rear section extend down to the ground and form part of the partition dividing the passageway and the front tier of pens.

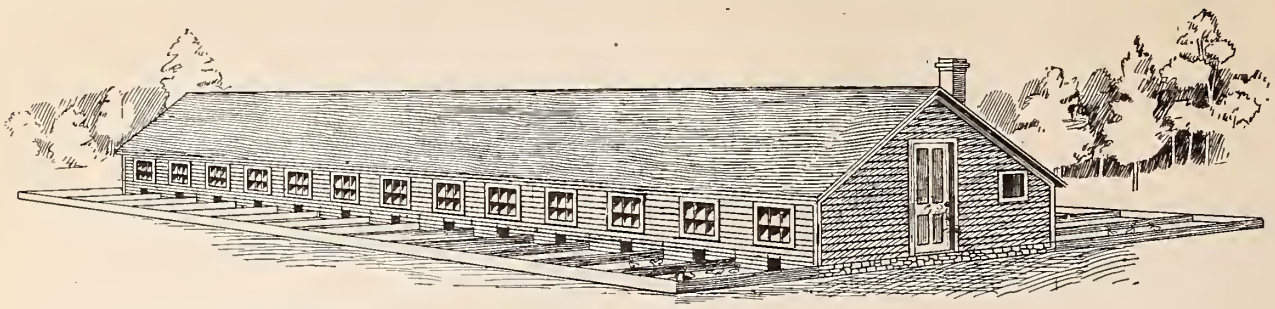
The rear wall or back of the house is only three feet high, the extreme height of the rear section being eleven feet. This gives the big roof a good pitch. The front section is forty-two inches high at the eaves and seven feet six inches high where it joins the rear section. This roof is a little too flat for the good of the shingles.

Board and wire partitions are used, two twelve-inch boards being placed at the bottom and two-inch wire mesh above. Doors open from the hallway into each pen. The attendants and visitors are required to step over a twelve-inch board in going in and out of the pens, the other twelve-inch piece being made a part of the door. Every door is supplied with a spring so that it does not fail to close after the large percentage of visitors, who, as the saying goes, "must have been raised in a barn", as they seldom close a door behind them.

In our opinion, here is the best style of brooder house for raising broilers that has been designed thus far. If a man can not raise chicks successfully in a brooder house of this kind, the chances are about ninety-nine to one that he is not qualified to raise them anywhere in any way. The bill of lumber for this house is presented herewith, and any good carpenter can build it.

Bill of Material for Reliable Double Row Brooding House—No. 3.

15	4x4	16 sills.
6	4x4	12 sills.
3	4x4	14 sills.
18	2x4	10 center studding.
15	2x4	12 side sills.
30	2x4	16 studs and plates.



Exterior View of Brooding House for Ducks.

12	2x4	14 studs.
36	2x4	16 foot rafters.
36	2x4	9 foot rafters.

Two thousand one hundred feet 12-inch stock for brooder and casing, 2,600 feet wide matched, 2,400 feet sheeting, 20,000 shingles, 48 windows 12x14, 4 lights 48 pairs 2-inch butts, 3 gross ¾ No. 6 screws, 150 pounds 8 common nails, 50 pounds 20 spikes, 10 pounds 8 finish nails, 4 pairs 4-inch strap hinges, 32 pairs spring hinges, 3,700 feet paper, 240 lineal feet wire netting 2 feet wide, 200 lineal feet wire netting 6 feet wide.

PRACTICAL BROODING HOUSE.

BY S. C. STUBBS, POULTRYMAN.

It seems that the first thing to consider in taking up the question of raising chicks by artificial means is the brooding house and appliances for successfully brooding them, for it is folly to hatch chicks and then expect to raise them in improper and wrongly built brooders and brooding houses.

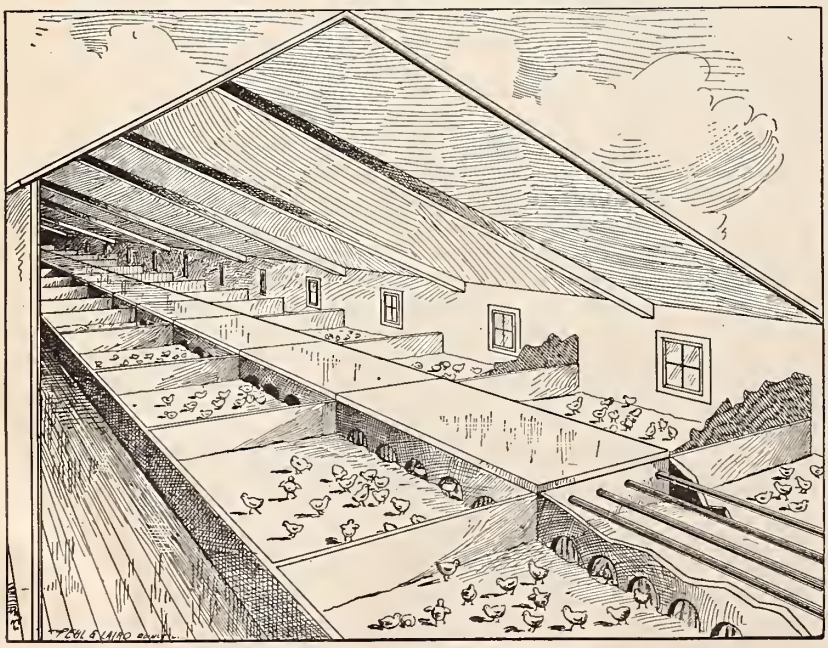
I have lost faith in any brooder that confines the chicks at any time entirely to the warm-air department. It seems to me that the only successful way is to have the warm-air department always warm enough, and provide a cooler place for them to go into in case it should get too warm.

To me it seems that a brooder house properly built, and heated with hot-water pipes, is the best and only successful way of raising chicks artificially. The writer has at the present time a brooding house heated with hot-water pipes, which he operated during the past season. The building used by us is twelve feet wide by seventy feet in length. The north side is six feet high, and the south side three feet, with double pitch roof, four feet slant to the north and ten feet to the south. The south side has twelve 10x12 light half windows, placed five feet apart.

On the north side three feet is left along the whole length for an alley; the balance is divided by lath partitions into pens five by nine feet. Through the center, four one and one-quarter inch pipes are laid, six inches apart, the entire length of the building, resting on supports four inches high next to the heater and gradually increasing to seven inches at the farther end. Over the pipes in each pen are board covers two and one-half by five feet in size with board sides parallel with its edges reaching to the floor and having openings for the chicks to run in and out. In the first two or three pens these openings are hung with cloth, having slits cut in it, similar to the curtain around the edge of a hover in a lamp brooder. Each pen holds one hundred chicks.

The frame of the building is made of 2x4's sheeted over with common boards and covered with one thickness of building paper, painted one coat. This covering will answer pretty well, but shingles are to be preferred if not too expensive.

This building complete, with hot-water heater, pipes, and everything, cost us a little less than $125, so that any one who expects to raise chicks very extensiveiy can afford to build a house of this size.



Interior View of Mr. Stubbs' Brooding House.

As each new batch of chicks is put in the pens the older ones are removed toward the farther end of the building, away from the heater. The dirt floor is covered to the depth of three inches with dry sand, and every other morning this is raked over with a fine rake, collecting all the dirt and manure, which is then sifted through a No. 6 sand sieve. This keeps the pens clean and free from odor. The heat under the hovers is kept at from 100 to 105 degrees until the chicks are four weeks old, running gradually down to 70 degrees by the time they are ten weeks old. The temperature of the room is kept at about 70 degrees.

I am a great believer in heat as a factor in raising chicks. I know some do not agree with me, but I have tried both ways, and I know if they are not kept warm enough they will die, and if they are kept warm they will not, so I believe in keeping them warm and letting them live. Persons coming into our brooding house will say: "Myl is it not hot in here; you will smother your chicks to death!" But the chicks

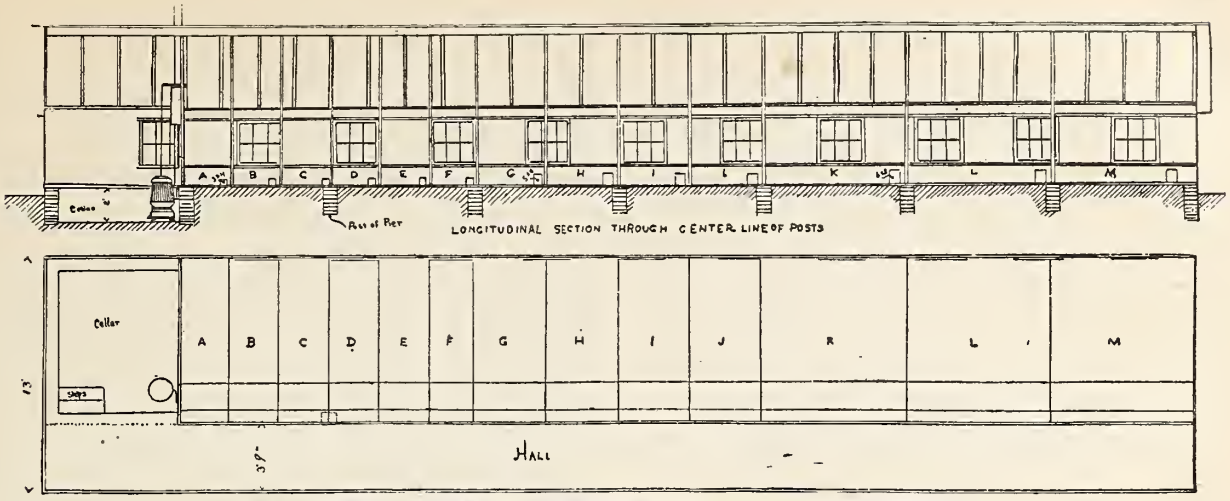


Fig. 1.—Ground Plan and Sectional View of Hammonton Brooding House.

do not mind it, and they are the parties we are trying to suit. If the chicks become chilled only once during the first two or three weeks of their life they are sure to have diarrhœa, and then it is a question if you will raise 50 per cent to maturity. I will repeat that if there is one thing more than another that I regard as essential to the raising of chicks it is heat. Keep them warm enough, and the kind of food and manner of feeding is a secondary question. By this I mean that they can be raised with proper heat and improper food, but not vice versa. Of course the best results require that the heat and food both be right.

Every little while we read in the poultry journals of some one who raised nearly 100 per cent of the chicks and fed only dry food, and another will be equally successful and have fed only soft food. This is rather bewildering to the novice who is trying to learn just how to do it (and probably lay the blame all on the food if results are unsatisfactory), but simmered down to facts, I think that any good, sound food, fed dry or soft, will raise chicks if other proper conditions are complied with. As for myself, I prefer to use both dry and soft food, rather more soft food during the earlier weeks and more dry than soft during later periods of growth. A favorite mixture with me is one-third each of corn, oats and wheat ground together and scalded to a stiff dough, or mixed with sour milk and then baked. As the chicks grow larger have it ground coarse and feed dry about one-half the time. Chicks should never be fed quite all they want to eat at any one feed, and food should never be left in the pens. Keep them hungry. Persons at our brooding house last winter, when the chicks were being fed, said I was starving them to death. When food was put in they acted like hungry wolves around a bone, but later, when they saw the growth those same chicks were making, I did not hear much said about me starving them.

Where much soft food is fed to small chicks they should be given very little water. In fact, if all soft food is used, no water at all is required during the first two or three weeks. This may seem rather an extreme view, but it is facts nevertheless. The sole aim should be to keep the chicks growing all the time, for if their growth is once checked it is doubtful if you can regain it.

A HAMMONTON BROODING HOUSE, WITH HOT-WATER PIPING SYSTEM.

The accompanying brooder house plans (Figs. 1 and 2) show the style of houses in use at Hammonton, N. J., and elsewhere. In this style of house the hot-water piping system is used, and instead of decreasing the number of chickens in each pen as they increase in size, the size of the pen is increased.

The brooder, as may be seen in Fig. 2, consists of boards nailed together with cleats, which rest on four hot-water pipes. In the brooder house at Hammonton strips of carpet are suspended from each side of the "brooder," and also between the pipes, nailed to the under side, with the fringed edges of carpet (double or single) just high enough so the chick can feel it on its back, and here is where they like to hover.

It will be observed that the pens grow larger towards the end away from the heater. The first young chicks are placed in pens A to G, to be followed by the next new hatch, and these earlier chicks are removed to larger pens. This shifting from pen to pen goes on until the house is full. The chicks that have progressed by successive stages to pens K, L and M are fit for broilers, and are marketed as fast as they are ready. The chicks have grown and need the larger pens to accommodate them.

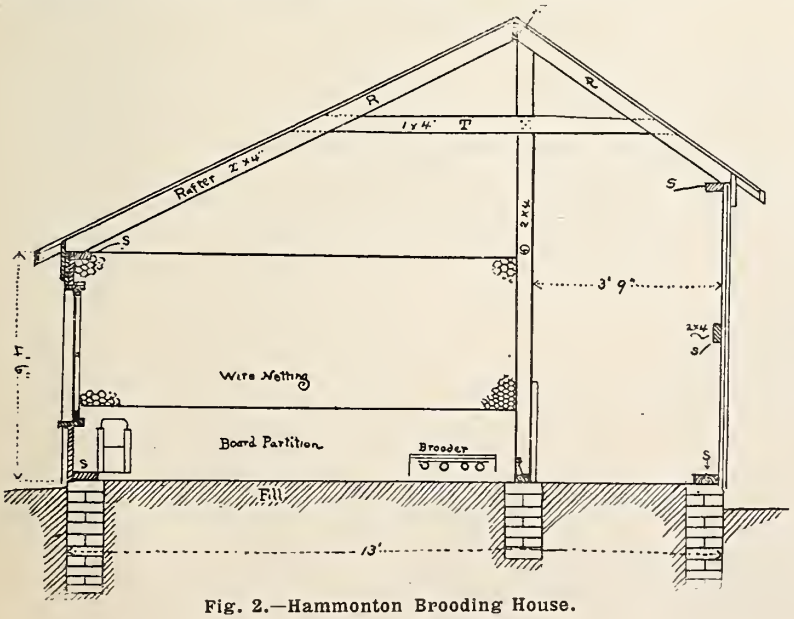


Fig. 2.—Hammonton Brooding House.

The pipes should be three inches from the floor for the smallest chicks, and from five to seven inches from the floor for the largest, having a uniformly upward slant from pen A to pen M. The brooder tops are twenty inches wide, and should be lined with paper on the under side. They are movable, each brooder top extending the width of the pen only. It is customary to enclose a room of suitable size at the entrance of the brooder house, where the incubators are kept. The chicks can thus be transferred to the brooder without inconvenience.

These pipes are fed with hot water from a stove or furnace located in an excavation at the A end of Fig. 1. The hot water circulates to and fro through a coil of pipes. The brick foundations are a protection against rats, mink, etc.

A MODEL BROODING HOUSE.

Planned to Accommodate Chicks Newly Hatched to Those Six Weeks Old—Forty-two Pens With "Progressive" Runs Into Which the Chicks are Daily Moved—Incubator Room and Importance of Ventilation.

BY C. H. PAYNE, C. E.

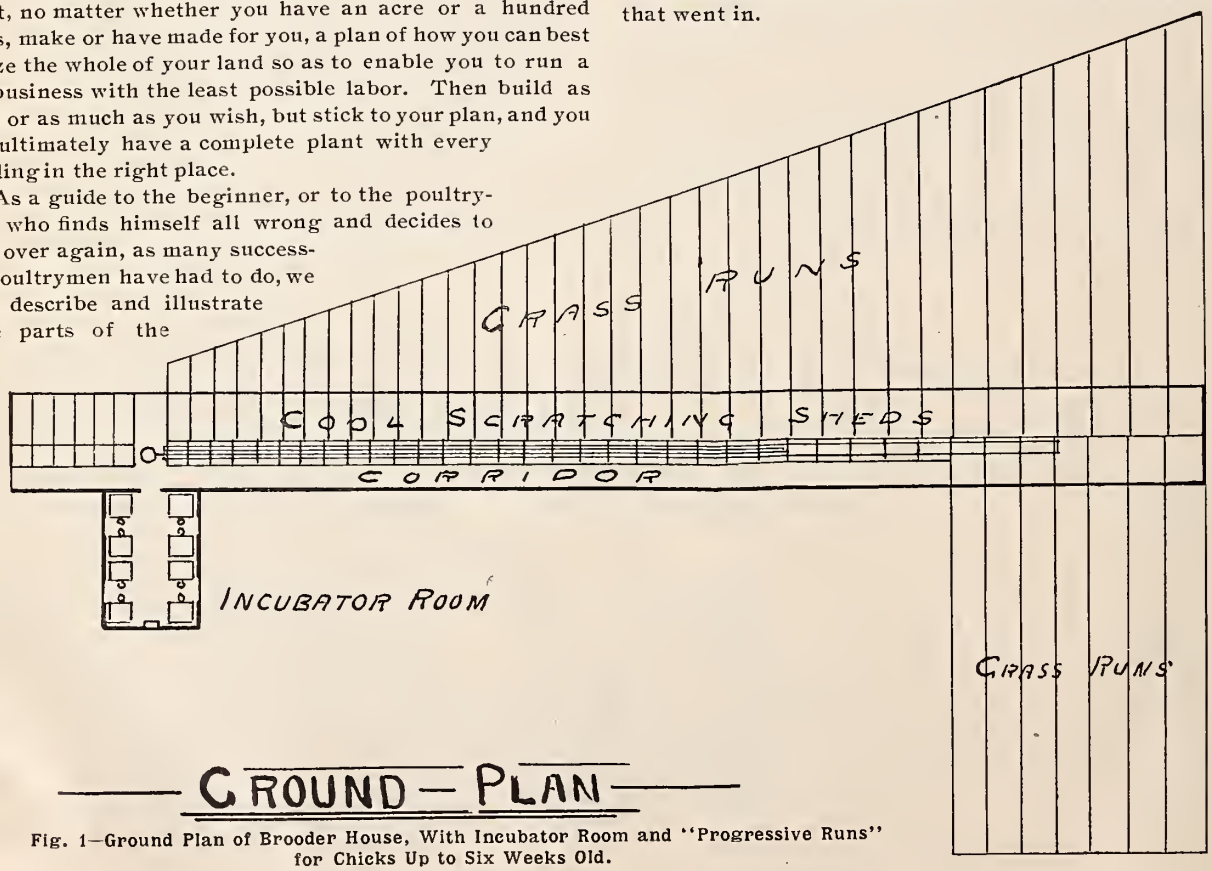
WE HAVE visited a number of poultry plants, both in Europe and America, and have been astonished to see the great disadvantages under which poultrymen are frequently struggling. The trouble is, so many plants have grown up bit by bit, without any definite object in view. Additions have been made to suit the convenience of the moment, and as a whole they are far from economic or satisfactory. In starting a poultry plant, no matter whether you have an acre or a hundred acres, make or have made for you, a plan of how you can best utilize the whole of your land so as to enable you to run a big business with the least possible labor. Then build as little or as much as you wish, but stick to your plan, and you will ultimately have a complete plant with every building in the right place.

As a guide to the beginner, or to the poultryman who finds himself all wrong and decides to start over again, as many successful poultrymen have had to do, we shall describe and illustrate some parts of the plan that we are working upon in building up the Utility Poultry Farm. There are of course many differences of opinion in the handling of chickens, and there are many methods. After thirty years' experience. during which we have studied and investigated the best methods on both sides of the Atlantic, we have adopted these ideas, among others, as giving the best results for the money invested.

Incubator Room and Its Ventilation.

The incubator room is of the usual character, sunk into the ground to a depth of three feet. This depth of excavation is ample in the northern states for up-to-date machines. The furnace room for the brooder house is also sunk three feet below the corridor floor and the entrance to the incubator room, being through this sunken part of the brooder house, acts as a vestibule and prevents a rush of cold air entering the room and so lowering the temperature.

One of the details that is frequently overlooked is the ventilation of the incubator room. It is simply absurd to install the room with machines, scientifically designed to supply the embryo chicks with pure air when the room is imperfectly constructed, and does not itself contain pure air. In civil engineering we have had considerable experience in the ventilation of public buildings, and therefore speak understandingly. We tell you plainly that it is not enough to have an inlet here and an outlet there, and trust to natural ventilation. The poultryman who would put perfect vitality into his chicks can only do so by the oxidation of the embryo by a constant supply of pure air into the incubator room. This air should contain in its bulk about twenty-one parts of oxygen to seventy-nine parts of nitrogen; which is essentially common pure air. If we introduce such air into the incubator, this oxygen of the air passes freely through the porous shells of the eggs, and in the more developed stages of the embryo, much of the oxygen is consumed as fuel in supplying the animal heat, and the volume of air that leaves the machine contains carbon dioxide in place of the oxygen that went in.



GROUND—PLAN

Fig. 1—Ground Plan of Brooder House, With Incubator Room and "Progressive Runs" for Chicks Up to Six Weeks Old.

Then again, the lamps of the machines in the act of combustion consume a quantity of oxygen, which undergoes a similar chemical change, and so the atmosphere of the room becomes charged with noxious gases, which, to say nothing of the peculiar odor of the oil of the lamps, renders the air void of life-giving power. We must therefore adopt some definite method of circulating throughout the room, without drafts, a continuous and sufficient supply of fresh pure air.

To Prevent Stagnant Air.

With a temperature of sixty degrees in the room and an external temperature of forty degrees, two ordinary flues opening two or three feet above the floor level will, if of sufficient capacity, maintain a constant change of air; simply because there will be twenty degrees of difference in the specific gravity of the interior and the exterior. The lighter air, together with the diffused impure gases floating therein, would be forced out of the room by the pressure of the superior air of the external atmosphere. Obviously, then, there is no difficulty in keeping the incubator room right in cold weather. The trouble is when the external atmosphere registers seventy degrees and the room also seventy degrees, there is then no margin of difference in the specific gravity, hence the air becomes stagnant.

To increase the temperature of the room beyond seventy degrees would be wrong, because it would reduce the circulating power of the ventilating system of the incubators. One of the foremost incubator manufacturers puts eighty degrees as the maximum temperature in which his machine should work, giving the machine twenty-two degrees of working power. While an incubator will give fair results under such conditions, we know by actual test that it will do very much better when the room is kept down to seventy degrees. We therefore lay down what will, sooner or later, come to be observed as a general rule, namely, that a building erected especially for incubators, shall be so constructed and ventilated that its variations shall be restricted between fifty and seventy degrees. In such a room with machines well adjusted, all other conditions being about right, incubation will become a mathematical certainty.

How are we to keep the room down to seventy degrees and at the same time constantly change the air? That is the problem. There is only one way by which circulation of the air is carried out by the natural forces set in play by temperature changes without mechanical adjuncts of any sort, and that is, to apply artificial heat to the exhaust flue. Increase the temperature of the exhaust flue to ninety degrees and we have a working gravity margin of twenty degrees.

In our plan this is accomplished without cost and without labor. We construct the exhaust flue of metal and lead into, and carry up inside of it, the smoke stack of the brooder house heater, and so utilize heat that is usually wasted. During the first hatch of the season the heater will not be working. That, however, will be early in the season when the external atmosphere is low enough. The end of the hatching season is the time when this is needed, and then the brooder will be running full blast, and the air in that exhaust flue will have a velocity equal to the smoke inside of it. By reference to the plan of the incubator room, shown in the ground plan, the fresh air duct will be seen at the north end of the room, and the exhaust flue is over the doorway at the opposite end.

A Fresh Air Brooder.

Our brooder house, as will be seen by the illustration (Fig. 1), is designed on the "progressive" plan with forty-two pens. The chicks are put in at one end, and pass from pen to pen daily, and come out at the other end when six weeks old. Let us point out wherein we believe many brooder houses are wrong: They do not provide sufficient space to enable the chicks to obtain proper exercise during bad weather, and they do not provide enough fresh air. The chicks are too often coddled and pampered as if they were exotics, and are kept in a hot-house temperature. Such a system is not well calculated to produce a large percentage of healthy chicks.

We know that chickens have lungs for the purpose of breathing in the air to gain its oxygen. These lungs in their size, their coatings and their rapidity of respiration are adapted to an atmosphere of pure air. If we fail to supply this all our efforts in other directions are rendered futile. Fresh air is one of nature's most bountiful gifts, and yet untold numbers of chickens perish every year for the want of it. We have demonstrated with the large pipe brooder at South Dartmouth, Mass., this season, that "infant mortality" is wholly preventable. Chicks were taken direct from the incubator and put under hot water pipes, without fringed hovers, in broods of fifty. Those chicks reached the age of two months—long past the "mortality" period—and there was never a sick chick among them, much less a dead one. That, however, is an expensive plant, built for a perpetual output of broilers. Ordinarily the pipe system is a little risky for baby chicks during the first few days. A cheap heater naturally burns low during the night and the temperature in the brooders necessarily drops just enough to chill the youngsters, but not enough to be felt by them after they are a week old.

The brooder house we illustrate is intended only for breeding stock, to be used from about the middle of March. For all the year round broilers we shall build a special plant like the one referred to at South Dartmouth. When chicks are not required earlier than the middle of March undoubtedly out-door brooders produce the hardiest stock; that is to say, those that survive all the hardships and perils that chicken life is heir to are perfect specimens of hardiness.

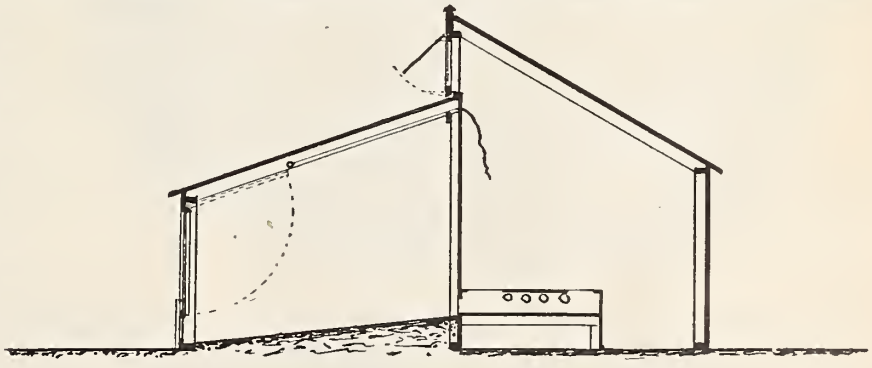


Fig. 2.—Showing Canvas Shutter in South Front and Window Between Roof in Brooder House.

We want the hardiness of the out-door brooder chick, but we do not want the accidental losses, and we do not want the trouble. We, therefore, planned our brooder house with this end in view, and we have so far demonstrated that we are on the right side. We have run a flock of sixty-six chicks and never had a day's sickness. Two came to a violent death by cats or rats, while all the others are perfect

specimens of what six months' chickens should be, and the pullets have been laying for a month past.

To prevent possible disappointment to beginners, we must explain that such results are possible only when all the conditions of chickenhood are favorable. First the eggs must be from stock of sound hereditary constitution; stock must be grown on free range, and mated and housed for strong fertility. The eggs must be incubated under natural conditions. That is to say, in a machine constantly supplied with fresh, pure air, and supplied correctly, so that it does not dry up the life's blood of the embryo, and then vainly seek to correct the matter by pouring in water. We have operated most of the standard incubators in Europe and America, and we never were able to grow a large percentage of chicks until we secured the "no-moisture machines." All these conditions have a direct influence upon the vitality of the chick, and we want to impress upon the beginners that it is only when all the conditions are about correct that we are immune from disease and death.

Where our brooder house differs materially from others is that we depend entirely upon the internal heat of the brooders—of course, for winter brooding this would not do. It is a cheap single boarded building (Fig. 2), wind-tight on the north, water-tight, open on the south, and fitted with canvas shutters to be used in bad weather to keep out snow and rain. The partition between the brooder pen and the sheds is of matched boards, with a door of similar boards, about two feet wide. leading into each shed. Over this partition, between the two roofs, are continuous glass sash, hinged at the top, to open outwards, where they are held by iron stays. If desired, a "green-house gear" could be used, by which all the sash would open or close simultaneously. These sash clap onto the outside of the upright scantlings, and the roofing material is turned up at the bottom inside of the sash, so the question of keeping the wet out is extremely simple. When the sash are all open they fit almost close together, like one long sash, and will turn the rain and keep the building dry whether open or closed.

Our chicks have the warmth and comfort of the old hen when in the brooder, and the freshness and purity of outdoor air whether in or out of the brooder. We know by experience that contact with fresh air quickens the circulation, invites to exercise, sharpens the appetite and promotes health.

"Progressive Brooding" from Six Days to Six Weeks.

Method is the great labor-saver in all things, more especially in the care of chickens. We believe in a methodical arrangement of the brooder house, so that the chicks shall have as nearly as possible, the exact temperature suitable to their respective ages, the space most suited for them, and so forth. This cannot be done when the pens are all alike. Every thinking man knows that what are suitable accommodations for newly hatched chicks, cannot be adequate for fifty six-weeks chicks, and if the pen is large enough for the bigger chicks there must be a great waste of room for the smaller ones. This is one important fact poultrymen have ignored and continue to ignore. It is, however, well for beginners to look this straight in the face. We have to "fit the accommodation to the growth of the chicks"—if we do not another potent factor will step in and promptly "fit the chicks to the accommodation." When the incubator room and brooder house are apart chicks are often chilled at the start by exposure to the cold air while passing from one building to the other. Such a chill usually upsets the bowels and the chicks are quickly pasted up in the rear and never get a fair chance. We avoid the possibility of such a chill by having our buildings connect.

While the pipe system is a great labor saver, it is, we think, a little too variable for the small chicks. We therefore start off with six separate indoor brooders for the little chicks for the first six days of their life. During the first day the chicks are limited to a space of three by four feet. The second day they are permitted to run out to a cross board, giving them two feet of the cool shed; this board is extended each day until they have the whole of the eight-foot shed. These chicks have no mother to guide their baby steps. We must therefore prevent them straying too far from the warm brooder until we find they know their way back. The vitality of a flock is often destroyed at this point by allowing them to stay out in the cold too long.

Theoretically we start with a temperature of ninety-five degrees and gradually reduce, until at the end of six weeks we have dropped to seventy degrees. We say "theoretically" because a few degrees either way does not matter. For the first day or two we do not like to fall below ninety degrees and we do not like at any time to exceed ninety-five degrees. On the seventh day the chicks are passed on to the pipe system, the first pen of which is three feet six inches wide. Day by day they are passed forward, each pen increasing one inch in width, giving the six-weeks chicks a space of six feet six inches—more than double the space they started with. Six days after the first hatch another hatch will be ready and the newly hatched chicks will be put into the lamp brooders. and so the house is kept running just as long as required.

PRODUCTION OF WINTER CHICKENS.

A Profitable Branch of Poultry Keeping That is Flourishing in the Neighborhood of Boston, Mass.—Description of Several of the Largest Plants.

BY GEORGE H. POLLARD.

A YEAR or so ago we gave an account of a visit to the winter chicken-producing region round about Hingham, Mass. Recently, under the genial guidance of Mr. J. H. Curtiss, we repeated a part of this trip, and we are setting down something of what we saw and heard. That the story might be more complete, we had the help of two capable artists, who have made the photographs for the accompanying illustrations, which are given solely for the pleasure and instruction of the readers of this book.

We proceeded by carriage from Queen Ann Corner to our first stopping place, which was the Curtiss Farm. At this place we found several hundred chickens in the pens of the smaller brooder building, which is 14x50 feet, and a larger number than usual of well-matured pullets, which were being held for sale and for breeding stock. We give a view of the longer brooder building, which is 250x 14 feet, and is piped on the overhead system with pipes one-inch in diameter. All the chicken plants in this section use practically this same style of building.

As will be seen from the picture, the roofs and sides are shingled while whole windows are set in the front of each pen. There is an aisle about thirty inches wide at the rear of the house, in front of which the hovers run, and from the hovers the pens extend out the remaining width of the building. In all of these houses there is no floor except such as

is made from gravel, which is filled in to the depth of several inches. Gravel also forms the filling-in material which is used under the hover pipes.

We also show a picture of a small house, 6x9 feet, without either perches or floor, and a view of the birds that are kept in this house. The adjoining yard is perhaps forty feet square. There were over eighty birds in each flock and, as may be judged from the pictures, they were mostly fully feathered and well developed. Nearly all were pullets, many of them just about to lay. There were a few cockerels, but none of the birds were less than three-quarters grown. They had in a wooden trough a plentiful supply of whole corn, and this, with a pail of water, seemed to be all that was provided for their sustenance. They undoubtedly had been given a liberal supply of beef scrap and considerable green food. The main point to be noticed is the fact that in this little common shanty, covering only fifty-four square feet of ground surface, there are accommodated eighty birds of nearly mature size, or rather more than one and one-half birds to a square foot. This is one of the shining examples of the methods in use in this part of the country.

Plant of J. H. Curtiss.

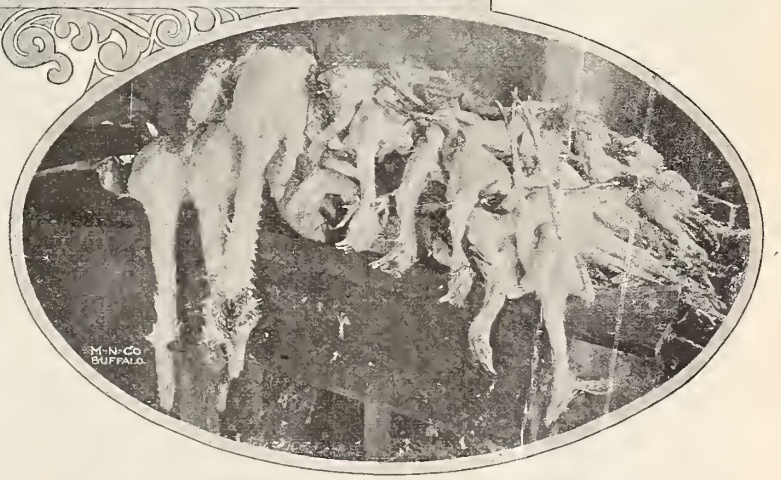
Mr. Curtiss, who carries on a large business in gathering and dressing poultry for the Boston market, and who handles much of the stock raised within easy-driving distance of his farm, had on hand, for killing, flocks of Toulouse and Embden Geese, a considerable number of Pekin Ducks, a flock of half-wild ducks, together with large numbers of fowls of all the varying degrees of scrub production.

Dressing Chickens For Market.

In dressing chickens for market, they are killed by cutting the vein and penetrating the brain at a point well back in the roof of the mouth. A deep cut at just the right point will so paralyze the nerves of the fowl that the feathers will pick very easily and much of the trouble in tearing the skin will be avoided. The chickens are dry picked. All the feathers are taken from the carcass with the exception of the tips of the wings, and from these all the quill feathers are picked. If the fowls have feathered legs, these are also picked. The heads are left on, and the entrails are not drawn. After picking and carefully pin-feathering, they are dropped into huge tanks of water and left a suitable time to cool. In hot weather this water is iced, in order to more quickly remove the animal heat. They are then rinsed and the blood cleaned from their heads, and are laid on a bench for the water to drain off, in which condition we show a pile thrown together haphazard as they are handled in the regular course of operations. (See illustration.) After draining, those that are nearest alike are paired together, the legs being tied with twine, and they are hung in a cool, dark room until the following morning, when they are packed and shipped to Boston or other markets. Mr. Curtiss' brother, who is interested with him in the business, has the general charge of the collection of the poultry, while Mr. J. H. Curtiss attends to its distribution and marketing.

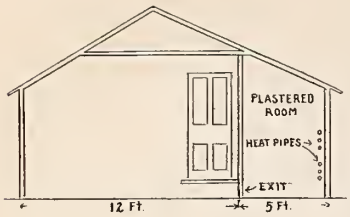
Caponizing Resorted to, and Why.

When the cockerels are about three months old they are all caponized. Mr. Curtiss, who is an expert operator, and who has caponized many thousands for himself and for others, is a strong advocate of this method of making market poultry. The birds are not sold as capons, but are marketed simply as chickens and are dressed as such. The gain comes from the great quiet of the bird and the absence of the quarrelsome, pugnacious disposition which grows with a cockerel's stature when in a natural state, and which prevents the rapid laying on of meat, while at the same time it spoils the color of the skin and the texture of the flesh. Mr. Curtiss charges four cents each when operating on hundreds, and five cents where there are a few birds. He has taught the art to many, and for this he is paid ten dollars; in classes of four at one time, twenty dollars. He does not expect to loose more than one in one hundred when the birds have been properly prepared.

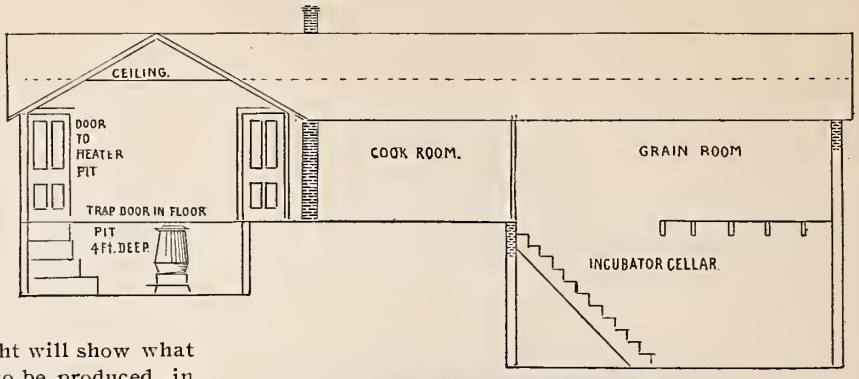


Winter Chickens Dressed for Market.

Within a radius of four miles of Mr. Curtiss' home there are grown, on a conservative estimate, upwards of 25,000 of these winter chickens, which will dress from six to nine pounds each. Allowing an average of seven and one-half pounds each, they would amount to over five hundred pounds



Cross Section through Wings.



Cross Section through Main Part.

for every day in the year. A little thought will show what a tremendous quantity of poultry this is to be produced, in chickens alone, within so small an area. The men who can do this successfully year after year have no reason to apologize for their existence.

Top Prices for Gilt-Edged Goods.

Mr. Curtiss last year paid for thirty chickens, alive at the owners' door, sixty-five dollars in cash. He has paid two dollars per head and over for load after load the past season. Some breeders would consider these not bad figures for pretty good breeding birds by the hundred. Mr. Curtiss gives me the name of Mr. Winsor, who from three hatches sold five hundred chickens, grade Plymouth Rocks, at these figures. He also mentioned a Mr. Briggs, who hatched in one machine, April 6th, 300 chickens. He paid for the eggs twenty-five cents per dozen. The cockerels were sold at about five months old, and Mr. Brigg's had left, as profit on his venture, 120 pullets, some of which are now laying, and sixteen dollars in cash above the total cost of eggs, feed and incubation—certainly, a fair profit.

Mr. Alonzo Osborne's Model Plant.

At the plant of Mr. Alonzo Osborne, which is one of the model plants of this section, we found about 1,100 chickens, which were as bright and smart a lot as we ever saw together. In two pens of 5x10 feet, which had a small opening between, and with one outdoor run in common, there were 300 particularly fine chickens six weeks old, which were the entire hatch, not one having been lost. In an adjoining pen there had been 138, which were hatched at the same time but which came from different eggs. Every one of these chickens had died.

Mr. Osborne, in common with other chicken men of this vicinity, is very strongly of the opinion that neither faults of warming, feeding or handling are the most general causes of loss with small chickens, but that far and away the most important point is the health and strength

Capons Ready for Market.

of the breeding stock, and this not only of the parent stock but this stamina should be inherited from at least three or four generations of vigorous breeding birds.

The most natural thing in the world, in cases where there is poor hatching or a large mortality, is to blame the incubators or brooders, where these are used.

Mr. Osborne, in order to test this point thoroughly, tried the same eggs under hens and in incubators and got the same results from each. The chickens that died from the incubator-hatched eggs were from the same breeding stock as those which died from the hen-hatched eggs. In each case the largest mortality was in chickens hatched from eggs from the same breeding stock.

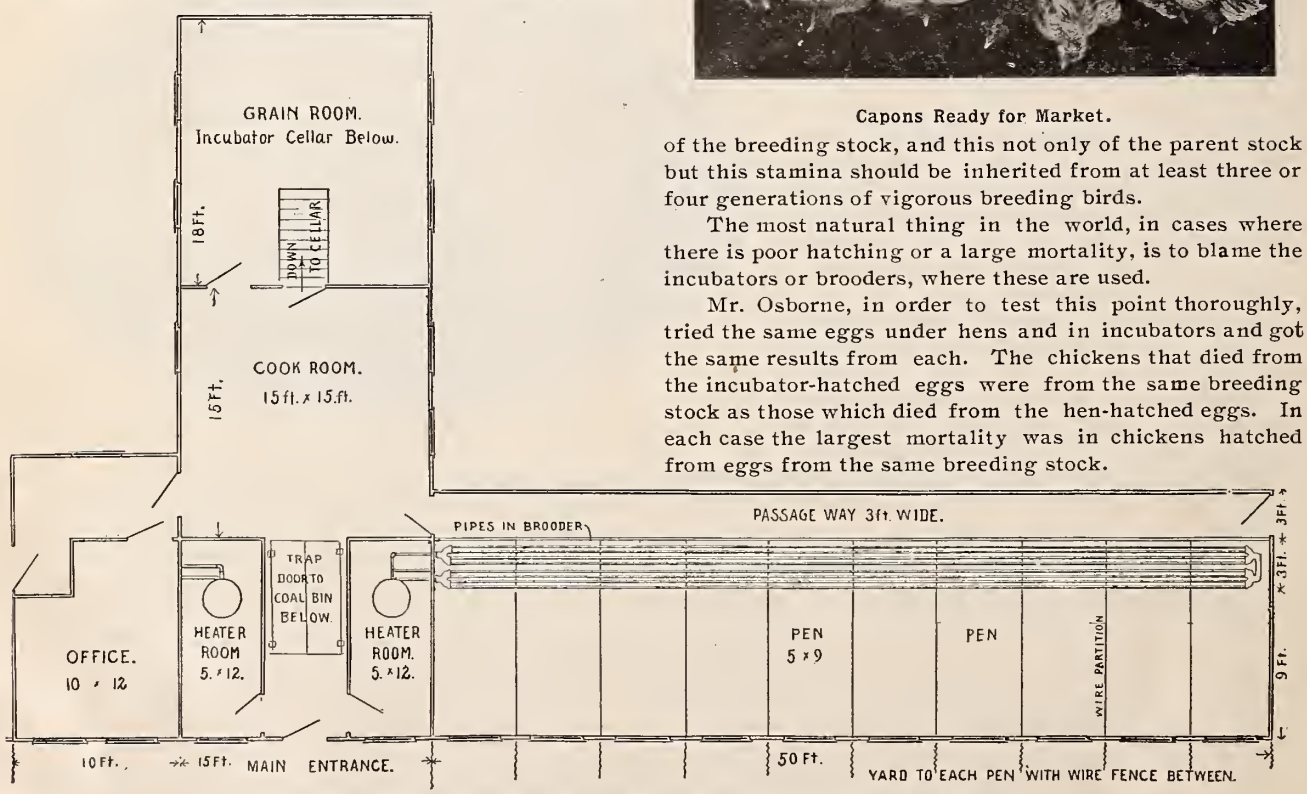
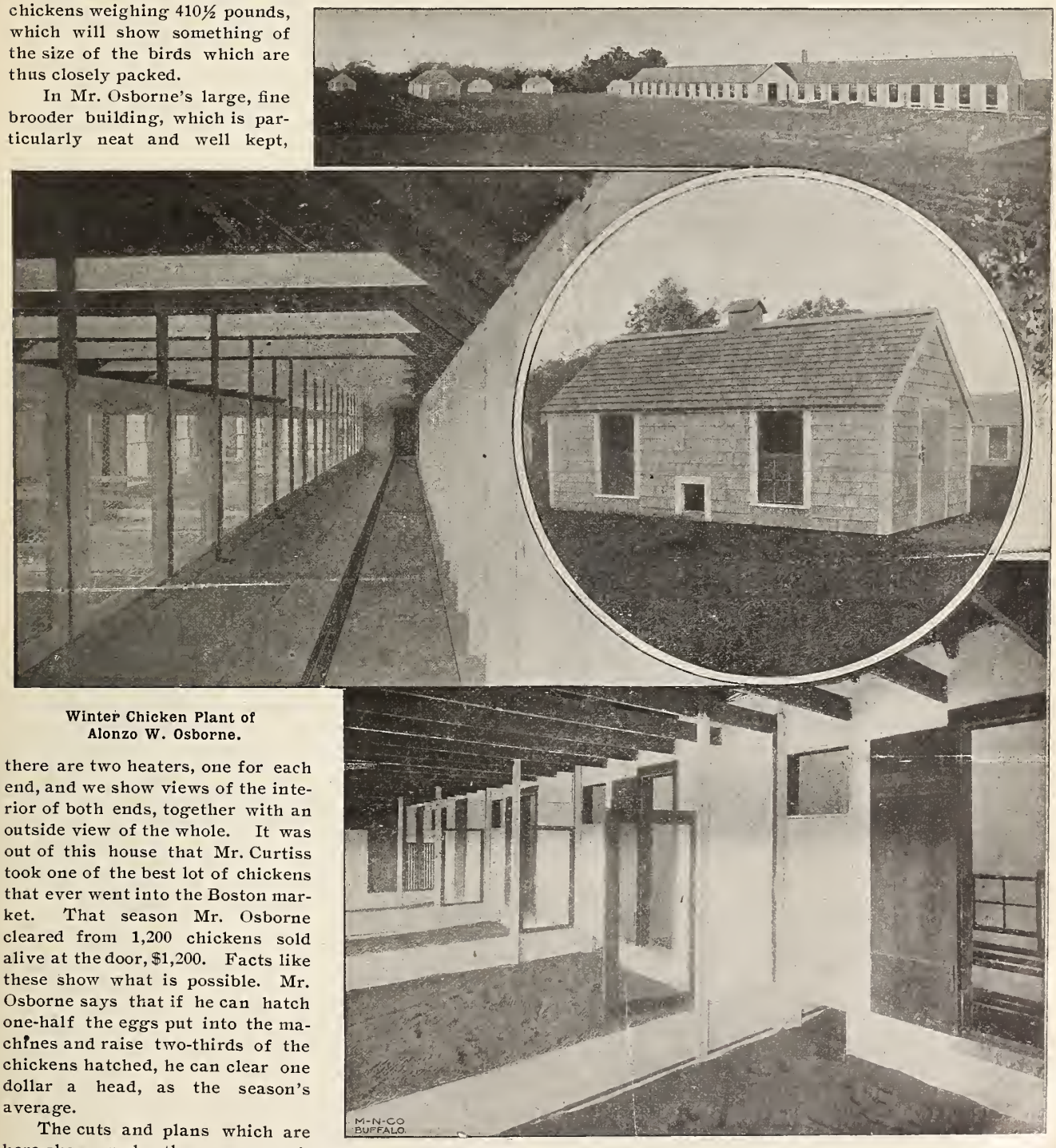


Diagram of Floor Plan of Main House and Right Wing of Osborne Building.

We show pictures of a group of Osborne houses 8x16 feet in size. In one of these houses 160 chickens were wintered, and they did well and were sold at a good price when weighing from five to ten pounds each. Mr. Osborne thinks that the chickens do quite as well, perhaps better, where they are considerably crowded in the buildings. In fact, to use his own words, "They do better to slap them all in together." He sold forty chickens weighing 410½ pounds, which will show something of the size of the birds which are thus closely packed.

In Mr. Osborne's large, fine brooder building, which is particularly neat and well kept,



Winter Chicken Plant of Alonzo W. Osborne.

there are two heaters, one for each end, and we show views of the interior of both ends, together with an outside view of the whole. It was out of this house that Mr. Curtiss took one of the best lot of chickens that ever went into the Boston market. That season Mr. Osborne cleared from 1,200 chickens sold alive at the door, $1,200. Facts like these show what is possible. Mr. Osborne says that if he can hatch one-half the eggs put into the machines and raise two-thirds of the chickens hatched, he can clear one dollar a head, as the season's average.

The cuts and plans which are here shown make the more prominent features of Mr. Oborne's building plain to the most casual reader. There are some of the details however, which may not clearly appear. The east wing of the building is fifty feet long and is heated by its own individual heater. It is used altogether for newly hatched and young chicks. The hovers are heated, as will be seen in the cut, by two coils or rows of four pipes each, one inch in diameter. That is, there are four flow and four return pipes, which give a free circulation of the hot water, and it is reasoned that eight one-inch pipes properly spread will give a more even and more equally distributed heat than will four one and a quarter inch pipes, which is the general size and plan. In hovers of not too great length we think this may be true, but in houses of great length we should expect a freer flow, owing to the less resistance from friction, and a consequent better result with the one and one-quarter inch pipes. In shorter systems, however, we should endorse the one-inch pipes as being nearly perfect. This for the overhead system of brooding.

It will be noticed that the two coils of four each are separated by a space of several inches. This is designed

to allow the chickens to choose between the two places that which best suits their individual desires, with the direct heat above or the less direct heat and better ventilation of the intervening space. In severe weather only the coils are covered with boards, which extend across the pen lengthwise of the pipes, and which form the hover. In mild weather no cover is used. The fronts are open. They formerly had doors which could be closed, but these have been removed. The chickens are so near that they can stand with their little heads up between the pipes while their backs nearly or quite touch. It is a pretty picture to see hundreds of dainty little birds standing contentedly in rows with their heads reaching up between the long stretches of black pipes, and their low, dreamy twittering is full of sweet sounds.

The pens are five by nine feet and slide open into long outside yards which are divided by one inch wire netting. In the fall these fences are removed and rye is sown. This is done early enough so that when the chickens begin to come along in late September, October and November, the ground is covered with a carpet of soft green rye, which provides a delicate vegetable food they can sample at will. This is one of the most important details of the business. It both sweetens and cleanses the soil and produces the very best and tenderest green food for the birds.

The west end of the building is divided into pens of ten by twelve feet. Into these the chickens go when old and big enough to graduate from the east end. Here the system and accommodations are unique. While the ceiling and back of the east end are plastered, the west end is partitioned into compartments along the back side of the house, each being the width of the corresponding pen and five feet deep. These little rooms are lathed and plastered on all sides and on the ceiling, and the partition between this room and the rest of the pen is plastered on both sides, as is also the roof ceiling and front of the main pens. Along the back of the small inside "sleeping" room is a bank of four one and a quarter inch pipes which are heated by their separate heater, which is entirely independent of the east end. This arrangement of heater and pipes makes it possible to give the larger chickens any desired degree of heat.

As will be seen, the windows are of full length and regular sizes, and are set in frames which allow of any desirable arrangement of open or shut windows, and the consequent airing and ventilation. The feed room contains a cook stove and the the necessary furniture for the carrying on of such culinary projects as Mr. Osborne shall entertain. There is a large grain room. Underneath this part is the incubator cellar. Mention should be made of the office which is tastefully fitted with roll top desk, couch, chandelier and other "fixins." When Mr. Osborne gets tired of caring for chicks he sits down in the cozy little retreat and figures profits and plans improvements. Taken all in all, for a complete little ranch all under one roof, we must award to Mr. Osborne the first prize as a designer.

We met briefly Mr. John Osborne, Mr. Alonzo Osborne's brother, who is also deeply interested in winter-chicken production. Mr. Osborne has the reputation of being one of the particularly sensible poultry keepers, and raises about 1,500 chickens annually. Occasionally, part of his time is spent in one of the shoe factories in an adjoining town. Mr. Osborne keeps about 200 laying hens, the larger proportion of which are Brahmas and the balance Plymouth Rocks and Brahma-Plymouth Rock crosses. The brooder building at his ranch is 100x15 feet, of the same type as that in use on the other plants in this section. A lack of time forbade our getting photographs of his equipment, and a further account will have to be deferred until another visit can be made to his place.

We wish it were practicable to give space to an account of what is being done by the other producers of this section, the Messrs. Smith, Jones, Turner and others, who are producing the very best of birds, are doing it in a systematic way, and who, in conjunction with the others above described, have helped to make this district, what it undoubtedly is at the present time, the leading center of the production of high-grade and profitable winter chickens. The results which they have achieved are bound to create an important addition to the spread and profits of the poultry business in this country. At present this highly profitable branch of the poultry industry seems to be confined to New England, in fact, to this one small section; but it is sure to develop in many parts of the country where a large population is found.

THE CARE OF ADULT FOWLS.

Allow Nature to Assert Itself—Do Not Pamper Your Fowls—Definite Instructions on Feeding For Winter Laying—Special Winter Care of Adult Fowls—Best Egg Rations—Feeding For Eggs.

PROVIDE a few essentials in the care of adult fowls and there should be little trouble in handling large numbers successfully. Poultry is naturally vigorous and hardy, but their constitutions can be ruined by imagined kindness. It is not, for example, true kindness to subject adult fowls to artificial heat. They do not need it. As a rule they will suffer from it. To subject fowls to artificial heat (which renders them tender) and then to turn them out into even moderate weather, is almost sure to bring on colds, throat trouble and roup. It is the fowl that becomes gradually hardened to cold that is able to withstand it and pass through the winter in good health.

Have your houses closely built, so that no drafts can strike the fowls at night; keep the houses free from bad odors; protect the fowls from lice, mites or other vermin; keep them at work as much as possible; feed sparingly of proper foods, and you need not dread disease in your flocks. These things are essential; provide them and you will meet with smooth sailing.

Poultry houses should be cleaned often enough to keep down the bad odors. In summer time (especially during damp weather) clean out three or four times a week, according to your accommodations and the number of fowls kept. In winter time twice or even once a week will do, if your houses are properly constructed and your fowls are not overcrowded. Overcrowded fowls require far more attention than those not crowded.

Use fresh loam or earth under the roosts rather than boards, as earth is a great absorbent of bad odors—a great purifier in fact—while wood (especially pine) soon becomes foul. Clean out the droppings frequently and change the earth under the roosts once every two or three weeks. Slacked lime is an excellent disinfectant. Use, as a lime sifter, an ordinary tin can with nail holes punched in the

bottom. Box up the earth under the roosts in such a way that the night droppings will not get scratched out into the litter placed in the pens.

In winter time by all means feed all grain in litter of some kind, and do not spare the litter. Use straw, chaff, leaves, weeds, corn fodder—anything will do if you have enough of it. Make your fowls work by keeping them hungry through the day. Send them to bed with full crops at night (especially in the winter time), but be sparing enough of food of all kinds in the daytime to keep them on the move, to keep them hunting and scratching for more. Have them so that they will eat up clean all that you give them.

We should like to italicize every word of the foregoing paragraph, it is so important. If you overlook or forget everything else in this book, remember the advice given above.

Every fall we thoroughly clean our poultry houses, removing all the litter and also at least three inches of the soil. We then put in three or four inches of fresh, sweet earth, obtained from fields or garden. This is put in the houses during dry weather, and under the constant scratching of the fowls becomes fine dust. Road dust contains too much horse manure to suit us, and we doubt if it is healthful for fowls, especially if it gets wet or becomes damp. We are certain that we do not like to inhale it ourselves; hence we advise dry, fresh, clean soil in place of road dust. During an hour or two after feeding time a person can hardly see twenty feet ahead of him in our houses, so full is the air of dust. It invariably makes us feel good to see this, for it shows activity among the fowls, and is a sure indication of health.

Fowls that do not scratch, and scratch with energy, need looking after. They may be sickly. They are either "out of condition" or are being over-fed. It is an easy matter to overfeed the larger breeds of fowls, especially the Asiatics. But do not underfeed. Avoid the two extremes. The more active birds can stand more food than the big, lazy breeds, for the latter pile on the fat with ease. They stand the cold better and are more contented in confinement—two things that are conducive to fat.

Dust is a paralyzer of lice. Lice cannot live in a cloud of dust. With plenty of fine dust handy, the fowls will themselves save you the trouble and annoyance of fighting vermin. In the fall when we put in fresh earth and fresh litter, we carefully whitewash the inside of the houses, putting an ounce of carbolic acid in every gallon of the wash. Fill all the cracks and crevices. Be liberal with the wash, it is cheap, and lice are the source of sixty per cent of the losses in poultry.

In feeding poultry the first thing to decide is, What am I feeding for?

If you have thoroughbred stock only, and are intending to furnish eggs for hatching purposes alone, then you do not want to force winter laying, for the demand for your eggs will be much better, and at higher prices during the spring months—during March, April and May. In this case it may become necessary to shift your fowls from pen to pen during January and February to prevent their beginning to lay too early.

If you wish to conduct an egg farm, as some farms are called, it will be to your advantage to force laying during November, December, January, February and March, when the market price is high for eggs as food, and to do this, you must do two things: Hatch out each spring a large number of early pullets, and then feed them for eggs the coming fall and winter. An egg farm pays well. The price of eggs seldom, if ever, falls below the cost of production, while in the fall, winter and early spring from 100 to 200 per cent can be made on every egg laid. It requires thought, system in feeding, and extra care to secure a large number of eggs during this time, and that is why there is money to be made in this branch of the business.

A market always exists everywhere for fresh eggs. No one need go a begging with a basket or case of fresh laid eggs, especially in winter time. Every human habitation contains a customer. On an egg farm, rightly conducted, $100 worth of feed can be readily converted into $300 worth of eggs in a month's time. Hotels and restaurants in cities are ever ready to buy, or to contract for eggs that are guaranteed to be fresh. In any city a person can work up a private trade at so much a dozen the year around. In Quincy, a western city of 40,000 people, well-to-do citizens willingly pay twenty cents a dozen twelve months in the year for eggs guaranteed by responsible poultrymen to be fresh laid. Down east they as willingly contract to pay thirty cents the year around.

Feeding For Winter Laying.

Herewith is presented the plan of feeding followed on one of the leading egg farms of the country.

We can make a fowl pay us a net profit of $2.50 to $3.00 a year, and so can anybody who goes to work right. The whole secret lies in that oft-repeated rule: "Hatch the chicks in April, keep them growing so the pullets will lay by October, and then keep them laying."

There's no magic about it, no "sleight of hand," but that plain, simple rule lived up to, and everything made to bend to it or revolve around it. It doesn't do to let the hatching go till May or June because other work needs to be done. If other work runs up against the hatching season or chicken work, so much the worse for the other work, for chickens on our farm have the right of way.

An important item in our creed is that the old stock must be sold off each summer and pullets raised to take its place. By doing this the price received for the old stock swells the total receipts, as the pullets cost nothing to raise —the cockerels hatched with them sell for enough to pay for the food of both themselves and the pullets.

Five mornings in the week we feed a mash made up of about one-third cooked vegetables mashed fine, or cut clover cooked by being brought to a boiling heat in water, an equal amount of hot water added, a heaping teaspoonful of salt to a bucketful; a heaping teaspoonful of some good poultry food two days, then cayenne pepper one day, poultry food two days, then powdered charcoal one day, and into this is stirred mixed-meal until the mash is as stiff as a strong arm can make it.

This mixed-meal with us consists of one part each cornmeal, fine middlings, bran, ground oats, and animal meal or green bone; a scoop or dipper of each being dipped in turn into a bag and poured from the bag into the meal barrel from which it is dipped into the mash. We consider the thorough mixing of these meals a considerable factor in making a good mash.

When we have cut fresh bone in abundance we omit the animal meal from the mixture, ordinarily we have only about half-rations of cut bone to go round, so use, regularly, half the amount of animal meal to make up the deficiency.

The foundation of the mash is the cooked vegetables, which may be refuse potatoes, beets, carrots, turnips, onions, (anything in the vegetable line), and into the pot goes the table waste, etc., and the potato, squash and apple parings from the kitchen. The potatoes, or beets, etc., are washed before putting on to cook, and the mess when boiled is sweet and savory.

This mash, our readers will notice, contains a great variety of food elements, and this variety is quite an important factor. A fowl needs a variety of food to supply

her various physical needs, and give her a surplus out of which to make eggs, and this "variety" of foods we believe we best can attain in the manner described above. An additional advantage is that a tonic or stimulant can be added if desired; we sometimes substitute a teaspoonful of tincture of iron for the poultry food, and sometimes add a handful of linseed meal or cottonseed meal; but the latter are somewhat fattening (as well as stimulating), and those who feed their fowls well for eggs must beware of too fattening foods.

This morning mash is fed in troughs large enough so that all of the fifteen fowls in a pen can get about it at one time, another important factor, because if the trough is small some of the birds have to stand back and wait for second table, and when their chance does come there's nothing left for them. With a trough four feet long by six inches wide, there is plenty of room, and if a biddy is driven away from one place she runs around and goes to eating at another, and thus all get a share.

Our fowls have exercise grounds in summer in yards 125x12 feet, which gives them a grass run (with growing grass always in the growing season), and they will take ample exercise in pleasant weather. To keep them out of doors the noon feed of whole barley (or buckwheat) and night feed (before sunset) of wheat is scattered upon the graveled space immediately in front of the houses. Each family of fifteen has a pen within the house twelve feet square, or 144 square feet of floor space, which gives about ten square feet per fowl. The floor is of earth, covered about six inches deep with screened gravel. On the gravel the grain is scattered in stormy weather in spring, summer and early fall, when we want the birds to stay indoors. When cold weather approaches, exercise must be stimulated, and we cover the pen floors four to six inches deep with chopped meadow hay, or chopped straw, into which the grain is scattered, and the biddies have to dig it out. Some poultrymen use dry leaves for pen litter; chaff from a threshing mill would be most excellent (nothing could be better), and we have found one or two cases where common cornstalks were used. With us straw and meadow hay are most easily obtained and we use these. What the scratching material is, is of far less importance than that the scratching material be there.

Whole wheat is the best grain food for fowls, whole barley is the next best, and buckwheat next. Corn comes last, and should be used only at night and in small quantities, when eggs are sought for. We make barley or buckwheat the noon feed five days in the week, and wheat the night feed five or six days in the week. We do not make the mash on Sunday, because we want to reduce the work to its lowest limit on that day, doing no more than the regular feedings and waterings, and collecting the eggs.

Monday we feed oats (or barley), wheat, whole corn.
Tuesday we feed mash, barley (or buckwheat), wheat.
Wednesday we feed mash, cut bone, wheat.
Thursday we feed oats, barley, wheat (or corn).
Friday we feed mash, barley, wheat.
Saturday we feed mash, cut bone, wheat.
Sunday we feed mash, barley (or buckwheat), wheat.

Two feeds of cut bone each week, one or two of whole oats, and one or two of whole corn (according to the season), give variety to our ration, and to that is added whole cabbages hung in the pens in cold weather to tempt picking them to get green food; or turnips, or beets, or carrots are split in halves and placed in pens to be picked to pieces and eaten.

Ground oyster shells and mica crystal grit are always accessible, and fresh water, replenished three times a day (warm in winter), and the water pans are carefully rinsed every day.

One variation from this program we propose making this winter, and that is a slightly lighter feed of mash in the morning, making it a breakfast rather then a full meal, and then scatter barley or buckwheat in the scratching material about mid forenoon (and the last feed mid afternoon), to induce even more scratching exercise. To search and scratch for seeds, insects, etc., is the fowls normal method of feeding, and the nearer we approximate to nature's way the better; hence the greatest possible amount of exercise should be compelled.

FEEDING FOR EGGS.

Results Achieved in the Noted "National Stockman and Farmer" Egg Contest—Surprising Egg Yield Obtained—How It Was Done.

ON January 31, the National Stockman and Farmer, of Pittsburg, Pa., closed its annual egg contest, which contest was opened February 1. Two hundred and twenty-four pens of fowls were entered by subscribers in this contest, 143 of which continued throughout the year. Weekly reports were required from each contestant and the value of the eggs laid was determined according to the current price of eggs in the Pittsburg market, this value being computed on the number of eggs as reported from week to week. The six highest winners and the number and value of eggs were reported in the Stockman and Farmer, as follows:

First—Pen 112, W. S. Stevens, Ohio, eight White Plymouth Rock pullets, an average of 289 eggs each, or a value of $5.02 per hen.

Second—Pen 189, William G. Dodson, Ohio, eight crossbred pullets, an average of 283 eggs, or a value of $4.82 per hen.

Third—Pen 115, J. G. Redkey, Ohio, eight White Plymouth Rock pullets, an average of 280 eggs each, or a value of $4.00 per hen.

Fourth—Pen 88, Z. N. Allen, Pennsylvania, twenty-four Single Comb Brown Leghorns, an average of 277 eggs each, or a value of $4.89.

Fifth—Pen 75, L. E. Bradbury, Ohio, eight Single Comb Brown Leghorn pullets, an average of 270 eggs each, or a value of $4.64 per hen.

Sixth—Pen 154, Z. N. Allen, Pennsylvania, twelve Barred Plymouth Rocks, an average of 262 eggs each, or a value of $4.24 per hen.

How They Did It.

In the Reliable Poultry Journal were printed communications from four of the five above named winners, giving their methods of housing, caring for and feeding the fowls entered in the contest. This is considered the cream of practical matter, and these communications are reproduced here for the guidance of persons who wish to largely increase the egg yield of fowls.

An Average of 289 Eggs Per Hen.

Ohio, April 15.

Editor Reliable Poultry Journal.

You ask how I managed and cared for my eight White Plymouth Rock hens during the recent egg contest as conducted by the National Stockman. I will be pleased to tell you. This pen consisted of eight White Plymouth Rock hens and one rooster. These eight hens laid 2,312 eggs in 365 days, or an average of 289 per hen for the year. Esti-

mated by the Pittsburg, Pa., market, week by week, each hen laid during the year $5.02 worth of eggs. They were kept in a house 12x20 feet long, divided into two parts, each 10x12, one part being used for a scratching shed and the other part containing the nests and roosts. The building is seven feet high and is a frame weather-boarded with pine siding and ceiled with matched pine flooring, which makes the house very warm. You will notice this pen had plenty of room. The floor consists of mother earth, and is covered about four inches deep in the fall, with road dust and sand. The building runs east and west, facing the south.

In the south of the building are two windows, which extend from the floor to the height of the building, thus admitting plenty of sunshine and light, so necessary to the comfort and happiness of the fowls. The perches are about three feet from the floor, and under them is the droppings board. A house of this kind in which fowls are housed during the winter months, with the right kind of food and proper care will insure the poultryman eggs all winter.

My hens were not out during last December and January and they were healthy, happy and contented as if they were roaming the fields during the happy summer months. They were all aglee with song and contentment and shelled out eggs every day even during the coldest days of last winter.

They have free access to oyster shells and grit. I give them twice a week fresh granulated bone. Their food consists of a warm breakfast, equal parts of bran, white middlings and chopped corn and oats, and into this, I put for them, fine beef meal. At noon I feed wheat, which is thrown into the scratching shed. This gives them exercise in obtaining their noon meal. In the evening they are fed whole corn. During the time from the first of April until the first of November, I feed the same, with this change: In the morning their mash is mixed with cold water, and in the evening wheat takes the place of corn.

Cleanliness is a very important matter in regard to the maintenance of the health of your fowls. I clean the house twice a week during the winter, and in the summer every other day. I have been breeding Plymouth Rocks now for five years, and have not as yet had any disease, and I attribute it to cleanliness and proper care. I am in the poultry business to stay.

Wishing the readers of the R. P. J. a prosperous year and a bright and happy future, also the editor a long and prosperous life, crowned by still greater success, I am,

Yours respectfully, W. S. STEVENS.

Winner of the Second Prize.

Mr. William G. Dodson, who won the second prize, writes as follows:

Ohio, March 26.

Editor Reliable Poultry Journal.

Yours of March 19 at hand. My pen of eight pullets that I had in the National Stockman and Farmer contest laid an average of 283 eggs each in one year. The pullets were from a Rose Comb Brown Leghorn cock crossed on White Leghorn hens. The house I kept them in was built of lap-siding and lined with Neponset paper and roofed with the same. Not a pin crack was left for drafts to get in. I have a good-sized yard fenced in with wire netting.

Each morning these pullets had a hot feed of chop, mixed with the water that the fresh bones and beef scraps were boiled in. After that some wheat and oats were thrown in the straw for them to scratch for. At noon they had ground bone and meat scraps and stale bread. At night they had in summer wheat and barley, and in winter corn and buckwheat.

At all times they had before them fresh water, and each day fresh milk. Twice a week I gave them some buttermilk. They also had at all times a good supply of broken dishes, seashells and limestone, broken in small pieces, and once a week they had a small quantity of ground ginger and black antimony.

The house was cleaned once a week and the floor sprinkled with air-slacked lime, and the inside of the house dosed with coal oil.

The dust box was four feet square and filled with sifted coal ashes and road dust mixed. Not one of them was sick or "off its feed" one hour in the whole year, and they are still laying and look as fresh as any of my chicks. They are from my best layers singled out for several years. I breed from none but the best. I have been experimenting for some time on crossing different chicks. I could just as well have entered a pen of full-bloods as cross-breeds, but so many laughed at cross-breeds I thought I would give them a trial.

I do not think any of you can do just as good without extra effort, for those pullets have been petted like children. They never knew in the whole year what it was to want for anything. No males were kept with them. Do not send to me for eggs or birds, as I have none to sell at present, nor this summer. Now, Mr. Editor, I have given you the facts in the case and you must pass judgment. Thanking you for the interest you have taken in the result of the contest, I remain yours truly, WILLIAM G. DODSON.

An Interesting Communication.

Mr. J. G. Redkey, of Ohio, won the third prize with eight White Plymouth Rock pullets that averaged 280 eggs each for the year. He wrote as follows:

Ohio, March 22.

Editor Reliable Poultry Journal:

Yours of the 19th at hand, and in reply to your request for a short article descriptive of my methods of feeding, housing and quality of stock in the late Stockman and Farmer contest, I have this to say: The varieties I breed are thoroughbred White and Barred Plymouth Rocks, of the Bowman and Boyer strains of White Rocks, and Farmer and Newell strains of Barred Rocks. My pens are composed of some choice birds.

I feed warm food in the morning, composed of cooked meat two parts and twenty parts of cracked wheat, with whole wheat and oats at noon scattered in litter. I feed oats, wheat and corn at night, with clover heads, cabbage, beets or turnips for green food, and cut bone, oyster shells and crushed limestone for grit.

My houses are built 14x20 feet, with a hall four feet wide in front, and four six-light windows in front. There is a partition in the center, making two pens of 10x10 feet to each house. These houses are double boarded, with tarred paper between, and are roofed with Marietta roofing, double seamed. Each house is five feet high in the rear and eight feet in front. Each house has an earth floor filled in with from six to eight inches of pounded clay, with four inches of coal cinders on top, which makes a floor perfectly dry.

My houses are frost proof, having withstood a temperature of twenty-one degrees below zero. This, I think, is one of the great secrets of winter egg production, as my twelve years' experience as a breeder of fancy poultry has taught me that you cannot expect to get eggs in winter with all the feeding and care you may be able to give unless you have comfortable houses for them.

There is also a great difference in the laying qualities of birds of the same breed, some strains laying almost double the number of eggs of others of the same breed. I have been mating some of my pens with that object in view, viz., eggs, and I have been in a measure successful, as my record in the late contest shows. I have been giving this

my attention for the past eight years, and by careful selection have increased the average per hen from 212 eggs nine years ago to 280. In my pens of White Plymouth Rocks and in the Barred Rocks I have brought them up from 205 to 264 in the same length of time. My yards are each thirty feet wide by 200 feet long, with one house for each two yards. Each pen contains fifteen hens and one cock, except the pens that were in the contest, which contained nine hens and one cock, and ten hens and one cock respectively.

I have never allowed my hens to raise chicks, as I hatch and raise all my fowls by artificial heat, and when I have a hen that becomes broody I remove her to a yard prepared for that purpose, containing no nests or secluded corners, and in a few days she can be returned to the pen again, and she will soon be laying again, as though she had never offered to sit. It is my belief that fowls hatched in incubators and raised in brooders, year after year, will lose, to some extent, the habit of incubation, as my Rocks are now much less inclined to become broody than they were a few years ago, and I firmly believe that were it possible to introduce no other blood in the yearly matings, except from those that were artificially hatched and raised, the results would be much more marked. I may be wrong, but I have in one of my pens a Barred hen hatched in May, 1893, that laid 297 eggs to March 1, 1895, and has never offered to sit. This is an exception, but only goes to prove what I believe is possible. J. G. REDKEY.

[Note—Mr. Redkey is confirmed in his opinion by the report of the United States Consul in Egypt, who states that the native hen of that country (where artificial incubation has been followed for centuries), has abandoned the work of hatching.]

No Excellence Without Labor.

Mr. Z. N. Allen, who came off fifth and sixth best in the contest, receiving an average of 277 eggs each from a pen of twenty-four Single Comb Brown Leghorns, and an average of 262 eggs each from a pen of twelve Barred Plymouth Rocks, favors us with the following valuable information:

Pennsylvania, March 25.

Sixteen years ago this spring I began an egg contest of my own. The preceding summer I had built a good hen house, so I determined to ascertain which of my breeds were the best egg producers. I penned six of each kind, Brown Leghorns, Silver Hamburgs, Polish and Plymouth Rocks. This gave me some experience in feeding and confinement (which lasted four months), and this experience has stood me well in hand ever since. Pens Nos. 88 and 154 in the Stockman egg contest were pullets from good laying stock. Those in No. 88 were hatched the first week in May, began laying about the middle of November. Those in Pen No. 154 were hatched the first of April, and began laying the last of November. They were well fed and cared for from chicks until the contest ended. Their houses were made as warm as could be done without artificial heat. Their apartments were kept clean and dry and were supplied with grit, ground bone and oyster shells. They had to scratch in the winter in litter, and in summer in sand. One side of their yards was spaded two feet wide. Then wheat was scattered and the sand was shoveled up against the side of the yard. To get the wheat they had to scratch it back until it was about level. This was repeated once a day during the summer unless it was too wet. When cold weather came they had to go into winter quarters and earn their living by scratching litter. They breakfasted on hot mash in winter and not very cold in summer. A short time after breakfast they went to scratching for life, some singing as they worked. For dinner they had green bone, meat and clover every alternate day, with very little exception. The noisiest time in the hen houses was from daylight until noon. I thought sometimes they were trying to see which could make the most noise.

I believe they had a more jolly time than I did. Along in the afternoon they turned their scratching into pecking cabbage. This sobered them down somewhat and gave them an appetite for supper, at least they got in a hurry and tried to see which would get the first bite. Some of them were so devoid of etiquette that they even flew up and lit on the side of the feed bucket. They appeared to relish very much boiled wheat and oats and some coarse bran, even if it was quite hot. After supper they got lazy.

Once a week the medicine man came around with his jar of cayenne pepper and made it a little hot for them in the mash. I believe the pullets in 88 and 154 laid eggs because they liked to do it. To cut it short, a notion came into the heads of these pullets in late summer or early fall that nothing but a new dress of a more gaudy kind would suit them. So one day they huddled together and threatened to strike. I took the hint and began to boil rye and oats together and mix bran with them. Said I to the biddies: "This shall be your breakfast. As for scratching you will be too lazy, so in its place I will give you all the meat and green bone you need, but you must sup on hard tack and all the sweet milk you can drink." So they supped on corn and milk. They made a quick job of it with a slight falling off of eggs. Pen 88 made a record of 6,645 eggs; Pen 154, 3,139 eggs. Thoroughbred stock, good, wholesome food and plenty of it, good warm houses and good care will make a success of poultry. Respectfully, Z. N. ALLEN.

Poultry Farm of A. F. Hunter; Houses Built on Scratching Shed Plan.

A HEN CATECHISM.

Answers to Everyday Questions that Are Asked of Poultry Paper Editors, Poultry Lecturers and Poultry Raisers.

[Answers by Mrs. Ida E. Tilson, of the Minnesota Farmers' Institute Corps.]

1. How many hens can be kept in a yard 75x100 feet, and a house 12x20 feet, latter 8 feet high? Ans. Good authorities recommend, per confined fowl, 100 square feet of yard room, and 8 square feet of house room.

2. We have a good, high hen house, built as a lean-to on our barn. Would it be well to finish off the loft for our hens to lay in? Ans. I have seen lofts furnished with nest boxes, etc., but no such room was very accessible or easy to clean, and cleanliness is the first condition of poultry success. I should judge it would be a cold place in winter and hot in summer; therefore not attractive to hens nor good for eggs. The main room, below, however, would be much more comfortable with a small enclosed loft above it.

3. When hen houses are built double walled, with an air space between, do you find the latter a harbor for insects? Ans. Insects could hardly penetrate the building paper which lines each side of the air space in my house built thus. Early, strict, constant cleanliness, by means of a broom, whitewash, fumigation, sprayer, etc., prevents any great accumulation of insects anywhere.

4. Can a force pump be used for cleaning the hen house and for other purposes too? Ans. Those who keep force pumps as window cleaners, fire extinguishers, etc., naturally do not wish kerosene and whitewash used. Many emulsions sprayed on fruit trees are similar to the insecticides for hen houses. Some years ago I used the same pump for the last two purposes.

5. Should the perch for chickens be round or flat? Ans. A broad, flat perch prevents the breast bone from crooking while it is young and tender. Fat adults and large breeds prefer the same, but smaller kinds seem to like a round perch.

6. Do you favor putting nest boxes on the ground? Ans. Yes, for Asiatics. Egg-eating prevails almost exclusively among smaller breeds, like Leghorns, Minorcas, etc. A nest box eighteen inches from the ground cannot be peered into as they walk about, and they are able to fly up when they need to lay.

7. In raising 200 or 300 chicks, would you advise the use of an incubator? Ans. I would rather raise that number by hens; but if your fowls are wild, and you do not understand feeding them to cause early sitting, and you like machinery, and have safe, suitable places for incubator and brooder, you may prefer the latter.

8. Which is the best incubator and the best brooder, and where are they made? Ans. No one could answer that who had not tried all. There are many well tested machines. I have successfully used an excellent hot-water one, the "Reliable" incubator of Quincy, Ill.

9. Is it advisable to try artificial incubation by placing eggs in manure beds? Ans. A man lately selling directions for such a scheme has been widely condemned by the poultry press. That method, said to have been anciently and extensively practiced in Egypt, is not practicable for our colder, changeable climate.

10. What is the best material to set a hen on? Ans. One year I tried several hens on widely different materials—hay, sawdust, earth, etc., but with eggs of the same age, kind, etc. Each hatched just nine chicks. The character of the eggs is most important. A hot, dry country and season require, however, more moisture about nests than under ordinary circumstances.

11. What is the trouble with hens when they will not sit their time out, or wish to change nests? Ans. Probably lice, mites or bed-bugs annoy them. Possibly they are "new" hens and want a larger sphere.

12. Does a sitter merely turn her eggs over, or does she also move them from outside in, and vice versa? Ans. She is not perfectly regular about either operation, but both turns her eggs over and moves them back and forth. The latter is proved by watching a sitting composed of different colored eggs. The incubators, therefore, which have their racks taken out and inverted as a whole, thereby also changing the relative locations of eggs, are scientific, but require a warmer situation for such cooling operations than do machines with an inside device to turn each egg in its place.

13. Is a cellar a good place to put little chicks? Ans. Not unless exceptionally light, dry and warm. I knew one attempt where sore eyes and many deaths resulted.

14. Do small chicks thrive as well on a floor as on the bare ground? Ans. In a damp climate, sitting on the ground gives chills and rheumatism. A dry climate would not furnish that objection, but rats and skunks easily work into a floorless coop. I use a little dried sand and chaff to remedy the hardness of boards, on the bottom both of coops and brooder.

15. Is cracked corn good for little chicks? Ans. Yes, for broilers. To future layers I would give cracked wheat and rolled oats instead.

16. How are corn and oats for laying hens? Ans. Corn favors richness but not number of eggs. It is very heating and fattening, therefore is suitable to feed winter nights. Oats are fine as an occasional winter ration, but their indigestible, clogging hulls make them most suitable for summer, when constipation does not prevail.

17. I have been told not to cut up raw vegetables in winter, because a hen's mouth is large, and she can swallow chunks which stay and freeze in her crop. Ans. There is no danger if vegetables are chopped reasonably fine. An English veterinarian, who has examined scores of diseased crops, never found a case like above.

18. Why not put cayenne pepper in their food to make hens lay? Ans. Pepper, like everything else which is a stimulant and not a food, needs to be cautiously used.

19. Is there danger of feeding too much ground bone? Ans. There have been reports of untimely molting caused thus, but few poulterers are able to buy or prepare enough for harm. I feed one ounce per fowl every third day.

20. Are ground clam shells as good as bone, if you can get them as cheap? Ans. Shells contain more carbonate of lime and answer for layers, but are not nearly so valuable for growing chicks as is ground bone containing phosphate of lime, like their own frames.

21. If I give ducks fresh water they set to work at once making it muddy as fast as they can. Do they need pure water the same as chickens? Ans. I supply fresh water twice daily for both ducks and hens, and all thrive well.

22. What is the best breed for an inexperienced person? Ans. Probably some general-purpose breed, like Wyandottes and Plymouth Rocks.

23. In full blood Plymouth Rocks, are the male and female of the same shade? Ans. The "American Standard of Perfection" still requires the same color of plumage in both, but there is considerable discussion on the matter, because the pullets naturally run darker than the cockerels, and thus two breeding pens are often necessary in rearing show birds.

24. What is the origin of the Plymouth Rock? Ans. It is a cross of Dominique and Black Java, with probably other slight mixtures. The breed is said to have been first exhibited in 1867 by its originator, D. A. Upham, of Wilsonville, Conn. Some strains by similar crosses may have been produced independently of his work.

25. How would a cross between Brown Leghorns and Plymouth Rocks do for laying? Ans. The cross would probably make a better layer than the Plymouth Rock and a poorer one than the Leghorn.

26. What is good for scurfy legs? Ans. Clean the legs with soap and water; then anoint with sweet oil or hen's oil containing a little sulphur.

27. Why did my little turkeys die when I greased them for lice with kerosene, as told to do in a book? Ans. I, myself, never advise kerosene; it is too severe. Scaly legs dipped in it often become lame. Fowls are made crazy by application on the head, etc.

28. What do you give fowls with gapes? Ans. Purer drinking water and cleaner yards, because gapes are usually caused by a little red worm found in water and dew. Air-slaked lime sprinkled over yards will purify them. If the fowl swallows a piece or two of raw salt pork, size of corn kernels, that may dislodge worms.

29. What is a cure for cholera? Ans. Joseph Wallace says there is no specific for genuine cholera. I would advise killing bad cases at once. Give the others a little lime or alum in their drinking water. If they mend, feed on bread and milk and table scraps at first. Give the poultry quarters, the well and the water dishes a better cleaning than ever before.

30. What causes spots of blood in eggs, and how may we prevent them? Ans. Generally the hens are too fat; hence, egg organs are crowded and there is a rupture of some tiny blood vessels while the egg forms and passes.

FEEDING YOUNG CHICKENS.

Poultry Men and Women of Experience Give Their Methods—Valuable Advice to be Remembered—Common Errors to be Avoided—"A Stitch in Time."

[Not all successful poultrymen feed alike. Various methods of feeding young chickens may be adopted, yet all may have beneficial results; circumstances and environments differ, and may demand different treatment and rations; dangers of ill-health that beset chickens in one state may be comparatively unknown in another, and the successful poultryman is he whose observation instructs him upon the particular necessities of his location.—Editor.]

Millet a Favorite Food—No Cornmeal Mush—Give Fresh Water and Let Them Hustle.

Feeding the chicks is one of the greatest problems the poultry fancier has to meet. When chicks are hatched with a hen I give them no food for thirty-six to forty-eight hours. In the incubator, when the hatch is very large and they are crowding each other at the window, I take them out as soon as they are apparently strong and place them in a brooder, giving them nothing for the first twenty-four hours but coarse river sand and fine Mica crystal grit. The next twenty-four hours I give them water and dry food in the shape of millet seed, pin-head oats, fine cracked corn and stale dry bread crumbs. My experience has been, however, that the little ones do better on millet seed alone for the first week or ten days than on any combination I have ever given them, but they do fairly well on any of the above rations.

I think more chicks are killed by the old-fashioned method of mixing up cornmeal and giving them all they can eat, than from any other cause. This brings on fermentation in the crop, followed by bowel trouble, and when this appears there is very little to be done for the affected chicks, and they usually drop off within a few days.

I never feed my chickens from the time they are hatched up to laying time the next year any mashes whatever, and I question very much whether mashes are ever beneficial.

After the chicks are old enough to leave the brooder they are continued on one of the above (or all of them are given at various times), and in the summer I keep the troughs (under shelter and arranged so that chickens can not get into them), well supplied with oats, cracked corn, wheat, millet and grit. Let me again call the fancier's attention to millet. This one article alone, which can be cheaply purchased, is the most valuable of all our foods for the little chicks, and I might say for the older ones also. It makes the best scratching food that I know of, and chickens are so fond of it that they will work in their scratching pens from morning till night to hunt out the little grains.

The drinking vessels should be at all times kept clean and filled with fresh water, the oftener the better. I have solved the question on my own place for the older chickens by a system of springs, as I call them. I have a system of water pipes running through the yards and outside runs, and by making a little leakage in one of the joints, cutting out a little hole as the pipe is laid underneath the ground, and fixing a basin to hold the water, I have cool, fresh water at all times. I cover over this little spring with a box or shade of some sort, then surround the spring with something or other so as to allow the chickens to reach in and drink, but not get into the water.

By carefully looking after these details one should be able to raise from ninety to ninety-five per cent of all the chickens that are hatched and that live to be three days old.

There will be a small percentage of each hatch that are strong enough to get out of the shell but have not enough vitality to survive the first three days. Where I use hens for mothers I never allow the hen to run with the little ones, but keep her confined, allowing the chicks to roam where they please after the dew is off. In this way each little one learns independence, and many times I find them far away from the mother hustling for themselves, while if the mother were allowed to go out with them they would depend on her to forage for them. Should a rain storm come up, each will hustle back to its mother, while if the mother were out with the brood confusion would result.

E. A. KEGLEY, Iowa.

President of the American Poultry Association.

A Variety of Food—Overfeeding Disastrous—Confine the Old Hens—No More Greased Heads.

I have no fixed rule for feeding young chicks, but experience (the best of teachers) has given me better results than any set methods I have ever tried. My chicks are not fed until about twenty-four hours old, when they are given oatmeal, dry. This is their only ration until they are one week old, when some millet seed is fed. Oatmeal and millet are fed alternately until the chicks are about three weeks old, when I feed a little wheat, also cane seed. About this time the oatmeal is gradually dropped and millet, wheat and cane seed form their principal ration. Occasionally they get a feed of bread crumbs or corn bread. When they are one month to six weeks old I feed cracked corn or any grain they seem to like. Up to this time they are fed five times a day, but are fed sparingly. I want them to eat everything up clean—in fact, they do better if kept just a little hungry to induce exercise. Especially is this true of chicks half grown. In my opinion the greatest bane to poultry raisers is overfeeding. At no time do I feed soft food to chicks.

When hens are used for breeding they are confined until the chicks are a month to six weeks old, and after that even during damp or cold weather. When hens are permitted to range they neglect to hover the chicks properly, but if closely confined the chicks will thrive during zero weather if they can but slip under the mother hen for warmth when necessary. When chicks are this old, if the weather is fine, the hen and her brood are turned out and sometimes they are fed but morning and evening. If they are taught to range a quarter of a mile from home so much the better.

I had an experience last year that is worth relating. In April I noticed lice on some of my chicks and greased one hundred and thirty. In two weeks from that time there were less than twenty of them alive. I had greased chicks many times before, but never with results like this. Their eyes would swell and close, and in a short time they died. John Skinner, of Nebraska, met with a like misfortune later in the season. Comparing notes we learned that each had applied the grease during damp, chilly weather, and we concluded that grease is all right as a lice destroyer if the weather is warm and dry, but all wrong if the season is wet. In both cases lard was used. My method of application was to dip my finger into the lard and apply the grease to the head and vent. This year I am dusting my sitters thoroughly three times during incubation and hope to take the chicks off free from lice. P. H. GOSSARD, Iowa.

Give Them a Good Start—No Hard and Fast Rule for Feeding—Follow Nature, And Do Not Forget the Grit and Green Food.

For the successful raising of chicks it is most essential that they have the right kind of a start. My experience has been that if they have the proper attention the first week or ten days from the shell, we may hope they will develop into the finest stock, either for market or the breeding yards. We must look well to the flocks from which we select our eggs, if we would have vigorous chicks, those that come from the shell sturdy and full of life. I shall assume we have such chicks, for anybody by proper care can have them, and a puny chick, exhausted by its effort to free itself from its prison shell, does not seem to me to be worth feeding or bothering with. When the hatch is over I remove the hen with her brood to the brood coop, or place the chicks in the brooder, and as some of them will be a day old or more, they will be looking around for something to eat.

The feeding of chicks! What a question this involves, and as many succeed by quite different methods, I am sure there can be no hard and fast rule to go by. I have no rules, as so much depends on the season and other conditions. I breed for eggs and to develop the chicks into the most useful breeding stock, rather than for broilers, and therefore strive more for stamina and a well made framework of bone and muscle, rather than a forced amount of flesh at the earliest age. I can hardly more than suggest my method. In its very simplicity I believe lies much of my success. Keep close to nature. Warmth and cleanliness the chicks must have. For the first food I find nothing better than cornbread (johnny cake), just such as you use on the family table, crumbled fine (it should be quite dry) and the old fashioned pin-head oatmeal. This is vastly superior to the various prepared oats on the market of late years. It is understood both are fed dry. My chicks seem to relish it from the start. From the first I keep water convenient to them in shallow pans and milk is splendid after the second week.

For the first few days the food is sprinkled on an inch or two of cut hay or chaff, allowing the chicks to pick at it and eat as much as they require. As there is no mush or soft food about this it will not sour in hot weather and is always wholesome. If the season is early and the chicks are confined indoors throw a shovelful of earth and fine gravel, or chick grit before the coop or brooder. If the chicks are outside they will usually find enough grit if the ground contains gravel. After the first week I feed four or five times a day. If they are not on a green range, green food in some form must be supplied (any vegetables they will eat are good). Early in the season, once a day, I give the chicks a feed of Pioneer Clover Meal, bran and cornmeal, one-third each by measure, scalded and fed warm. If rightly prepared this mash will crumble readily. Boiled potatoes are relished by the chicks and make a fine change occasionally throughout the season. Do not pare them or mash them; break them open and the chicks will see to it that none is wasted.

After the first week or ten days, make the chicks work for all their food except the mash. While the season is so early that they are partly confined indoors, throw wheat, cracked corn and buckwheat into three or four inches of cut straw or any litter not too coarse. The chicks will find it all and nothing will keep these early chicks in such fine condition as the exercise. When the season advances, if they have a free range, this method is not so essential. I

raise my chicks almost entirely on dry grain and think this much better than to use soft food freely; they certainly thrive on it. I seldom lose one save from accident.

Of course animal food in some form must be supplied. Chopped raw beef is fine and a little of it will supply quite a colony till they get to be a month or more old, when fresh cut bone can be substituted. Feed this alone, not in the mash. If fresh meat in some form cannot be obtained, any of the good prepared animal meals may be used to advantage. When the chicks are on a free range with natural green foods, I would omit the clover from the mash, which now need to be fed only on alternate days, but throughout the summer if any large number are kept, it is an advantage to continue the animal food, as but few ranges will supply enough in the form of worms, insects, etc., to meet the demands of large growing flocks. I trust there may be some helpful suggestions in these lines. I could give no rules, nor do I believe chicks could be raised by rule and develop all the good there is in them. Study your chicks. Watch out for their needs. If you are a true poultryman or poultry woman, you will learn of them lessons in nature's way that will lead to success.

G. M. DIVEN, New York.

The Crop an Indicator—Animal Food and Charcoal—Oats Are Satisfactory—Overfeeding a Danger.

"Tell me what you eat and I will tell you what you are," might in a measure be as well applied to poultry as to people. We have seen this exemplified from placing eggs with different people to have chicks hatched and raised for us. From one, the birds would come home in the fall round-up, nice, large-framed, full-feathered, thrifty fellows; from another they would be little, crooked, rough-plumed scrubs, although the eggs came from the same pens and were equally good. The food and care made the difference. We lay no claim to being experts in this matter, as we are learning something every season. Our range is limited and we speak only of feeding under such conditions. We have raised our stock both with hens and in brooders, and with about equal success. When the chicks hatch they are let alone for about twenty-four hours, then they are fed a very few dry bread crumbs and dry oatmeal. A small amount of dry egg shell is sprinkled where they will pick at it, and after three or four days fine grit is used. The oatmeal and dry crumbs are continued for two or three weeks. At the beginning of the second week a cake is added, made of sifted chop food (corn and oats) ten parts, poultry food one part, a little salt and baking powder, mixed with milk until moderately stiff and baked until it will crumble nicely. This we try to feed in such quantity as will satisfy and not overfeed them. Our indicator is the crop. If it seems to be all right, all is well, but when it shows signs of being too full we shut down on the rations a little until they seem to be digesting the food thoroughly.

Millet seed is used after the first week and until they are turned out. It is scattered in the straw litter and they dig it out. A chicken loves to scratch if there is anything in it, and it pays to indulge this liking. At about four weeks old some wheat is fed the same as the millet, and cracked corn and oats come along later.

We use a good deal of green food. When grass cannot be had, beets, sweet potatoes, and onions are used, sometimes chopped and fed in the mash, and sometimes fed alone. From the time the chicks are a week old we have some sort of green vegetable food where they can pick at it when they wish. Green mustard is something they like and is a splendid food. Animal food in some form is fed steadily after the first week. We have used blood meal, meat meal, and scraps from the butcher shop and find all are good and that a change is desirable.

Charcoal is kept in reach of the chicks from the first and at times they eat quite freely of it. We have tried the green ground bone idea and like it, except for the hard slow work and the difficulty in getting fresh bone when wanted, so we have dropped it and keep granulated bone where they can eat as much as they like, and that is considerable. This is not a substitute for grit, but is fed side by side with it. Fresh, clean water, is kept within reach of the chicks from the first day and they are allowed to drink all they want. Milk is also given freely and we think it an excellent food.

As the chicks become older and are turned out to hustle we like to have a patch of green oats for them to run in. As the oats head out and the grain begins to fill, the chicks will jump for it, and not only get plenty of exercise, but obtain one of the very best of foods for bone and feather growth. We like oats for a food from that time on, and last year we tried feeding them in bundles, as they came from the binder. The experiment proved so satisfactory that we shall try it more extensively this year.

What to feed is of no greater importance than how and when to feed. We feed our young chicks five times a day until a month old, after that three times. We try to feed in such a way that food will not be wasted by being tramped upon, nor by being left to spoil. We remove the food dishes after every meal and try to give only as much as they will eat up clean. We have come to the belief that there is more danger in overfeeding than any other one thing, and that much cholera, roup and other diseases so-called are merely the result of over-feeding and indigestion. We have paid dearly to learn this lesson, and like many other people with dearly bought experience and well-founded belief, we still find that it requires constant care to keep from doing the very thing we know we should not. Our idea is to feed plenty, but do not over feed.

STRUTHERS SISTERS, Illinois.

Warmth an Essential—Egg Shell "Meal" and Prepared Foods.

The method of feeding that has given me the best results with young chicks, for the first twenty-four, thirty-six, even forty-eight hours, is nothing. All they need then is warm brooding, and this during cold weather I usually secure by the use of flannel-lined boxes or baskets, placed in the house near the fire. When they are ready for their first feed, they are placed with the hen and their bill of fare is limited. They are not given any water the first day. For food they have lightbread crumbled very fine and egg that has been boiled half an hour and mashed as smooth as I can do it with fork or spoon. One egg to two slices of bread is given and I salt and pepper the eggs as if for my own eating. To this bread and egg, I add a generous handful of shell meal. By "shell meal" I mean egg shells that have been thoroughly dried, and then rolled till a fine meal. Long before the wee ones are due to hatch, the shells from the eggs used in my kitchen are thrown into a pan that stands on a shelf on the back of the stove. There they dry out thoroughly, and can be easily rolled.

This food is given five times a day for four or five days. Feed the hen whole corn, then she will not eat so much of the chick food. Give them water after the first day, where they can go to it at pleasure. After the first four or five days give millet seed for the 10 a. m. and 3 p. m. feeds. In a few more days give rolled oats (such as we use on our table) at one of these hours.

After a week old they are given fine grit till they are large enough to use the Mica Crystal grit. My young fowls have the run of the whole place, fields, pasture, barn lot, every place in fact but the breeding yards, and they even go there as long as they are small enough to squeeze between the pickets. Some of my fences are woven slat and wire fence. In this wide range, they pick up a great deal of their living, often coming up at night with crops so full that they care little for their evening food.

MRS. W. B. CHANDLER, Illinois.

Not What You Feed, but How You Feed It.

To hatch and raise chicks with success one must have eggs from healthy, vigorous stock. The next thing to look out for is lice. If hatched by hens, dust the sitter well at least twice during the hatch and the last time about three days before the chicks are due. Give her another dusting when chicks are about a week old. Chicks must be watched closely and when seen standing or drooping around you will generally find the cause is lice. The greatest loss with chicks is from over-feeding, which causes bowel trouble in different ways. I find by keeping them a little hungry they thrive better in every way. When first hatched chicks should be put into a warm coop or brooder, with plenty of coarse sand

Subjects of Experiment at Rhode Island Experiment Station.

on the bottom. Do not feed for at least twenty-four hours after hatching. They will pick out considerable grit from the sand, and it puts them in a fair way to receive their first meal. For the first two or three days I feed only stale bread or crackers soaked in milk, squeezing it out and dry. After that I begin to feed millet, cracked wheat or corn and oatmeal. When about two weeks old I feed fine cracked corn, that being their last meal at night. By keeping away the soft food it does not give them a chance to get their downy feathers damp, which is a great drawback to young chicks. Their drinking dish should be made so they can get only their bills into it, and it should also be kept very clean.

After four or five weeks I feed a mash that contains about one-tenth beef scraps of some kind. I find it is not so much what you feed as the way you feed it, for I have seen chicks fed every well known food, with plenty before them, that did not thrive. If your chicks seem out of condition, stop feeding them one or two meals and you will find them much livelier. If they are nibbling at food all the time they will stand round more or less and not get the exercise they need to insure health. Scratching or hustling around for their food insures vigor. Chickens when growing should have liberal grass range. If their quarters are limited they should be supplied with some kind of green food, and at all times should be housed in a clean dry place.

J. H. JACKSON, Massachusetts.

Fresh Air—Lots of Light—Oats and Wheat an Ideal Food.

After the chicks hatch I let them stay in the nest until they are twenty-four hours old. For the first three days I feed on bread crumbs and keep fine chick grit before them at all times, so that they can help themselves. I prefer this to mixing it in the mash. After the chicks are three days old I feed in the morning a mash of oats, wheat and corn, ground together, at the rate of two bushels of oats to one each of wheat and corn. With this I mix some bran, and twice a week add some animal meal. I mix this the night before, with boiling water and in the morning I feed what the chicks will eat up clean. At noon I feed cracked wheat, and at night cracked corn. When the chicks are large enough I feed them whole wheat and a larger size of cracked corn. I also feed oats and table scraps when we have them. I give fresh water twice a day and use drinking fountains, so they will not foul the water.

I house the chicks in houses nine by six feet, with one window and a door of one-inch mesh wire netting. This kind of house gives fresh air and good light. Chicks are yarded in large yards until three months old and then have free range. I clean the houses three times a week and keep the lice out of them. Chicks raised in this manner are strong and vigorous and in the fall are in fine shape to sell for breeders or to go into winter quarters for layers. You will notice that I feed largely oats and wheat and a very little of corn. Oats are the best bone and muscle builders we have, and if I could feed but one kind of grain, I would use wheat, so by combining the two we have an ideal food with just enough corn to balance it. With the food and care I give my growing stock I can raise a large percentage of the chicks hatched, and while I do not raise chicks by the thousands I am doing a good business and raise more each year. I have had chicks weigh three pounds at fourteen weeks old, and to lay at the age of four months and seventeen days. I have a few pullets that have laid two hundred eggs in a year. While I do not encourage early laying it shows that chicks hatched early and kept growing will begin to lay early when eggs bring a good price. I prefer to hatch chicks in March and April for winter layers.

A. P. WINSLOW, Maine.

Plenty of Heat and a Chance to Reach It—Causative Feeding.

I have no hard and fast method of feeding, as my aim is to have strong, healthy chicks that will grow on good food, even if not perfectly balanced, also to raise fowls as near perfection as is possible. The winnings of my birds at leading shows vouch for exhibition quality, and a record of 242 eggs from a pullet in 1899, speaks for the practical side, For brooder chicks my method is first, plenty of heat and a brooder where they can select the degree they wish. I want it fully 100 at the warmest place.

The rations are steel cut oatmeal, finely ground glass, and charcoal for five days; then I begin to give little bits of lean meat, and in a week I mix a good soft food of cornmeal, bran, middlings and meat meal, and feed lightly, All feeding must be what the doctors call causative. Watch your chicks. If they grow at once and keep at it, your method is good; if not, you must try to find the cause and change just a little. If you add meat and it affects the bowels just a little, simply hold it off a day. But if judgment is added to feed, meat makes the fowls grow to per-

fection. If the chicks are confined for eight weeks I, of course, add some vegetables, and after two weeks finely cracked corn. If you keep them growing for four weeks and get them out in the open air after two weeks you have almost a sure thing of it.

For chicks with hens I use oatmeal and cracked corn, about half and half. I do not use flake oats. By all means get granulated oats and feed dry food at the start. I have started hundreds when out in the fields on just corn, only I want it sweet, and free from mouldy grains, and second, I want it finely cracked—about the size of one-third of a wheat grain. I feed the dry food a week, then begin with the mash, once or twice a day. If dry weather comes and they do not grow to suit me or as they should, I feed one feed a day pure meat, especially to Leghorns or any that feather quickly. Chicks cannot grow on wind, although air is essential. I am a firm believer in plenty of good balanced food four times a day. W. W. KULP, Pennsylvania.

Give Sand, Grit and Fresh Water—Keep Different Aged Chicks Separate—Afford Range.

We have always hatched our chickens with hens, but this year I purchased an incubator and we shall try to hatch with the machine and give the chicks to the hens to raise. In the first place we try to have as fertile eggs as possible, and after making nests for the hens that want to sit, we let them sit a day or two before giving them eggs. This settles the nest and gives them a chance to find out if they really want to sit. We give to each hen thirteen eggs, selecting those of as good shape and as near the same size as possible. I have come to the conclusion that thirteen eggs are all one hen can cover. If you give them more they will surely break some, and in the end you do not get any more chickens. We always set from four to fifteen hens at one time, and then when they are through hatching we give each hen fifteen chickens as far as they will go, and reset those that are not given a brood. I prefer to set about twelve hens at one time, as a flock of eighty or one hundred chickens live and grow better if they are all of one age than if they are from one to three weeks of age.

We do not take the chicks out of the nest until they are from twenty-four to forty-eight hours old. We feed rolled oats (a cheap grade), which are fed dry, and also make a cake composed of equal parts of corn and oats ground together, to which we add a little bran and shorts and a small part of animal meal. This cake is made with sour milk, seasoned with salt and a little baking soda is added to keep it from being too heavy. It is baked until well done and fed dry. As soon as the chickens are large enough to eat cracked corn and whole wheat (about two weeks old) we keep increasing this food and decreasing the rolled oats and cake.

Do not forget to keep your chicks in a dry place; do not forget to give them sand, grit and fresh water; do not let the older ones eat with the young ones, as they will get all the food and are liable to trample the smaller ones; do not think this is the only way to raise chickens, as you may have food and conditions over which you can judge better for yourself. Give your chickens as free range as possible and about October first separate the cockerels from the pullets and get them into winter quarters as soon as possible.

W. A. CONGDON, Illinois.

Dry Grains, Lots of Grit and Cool Water—Keep Them Free from Lice and Dampness.

I have had the best success by feeding dry grains and plenty of grit and cool, clean water. Chicks require no food the first twenty-four hours, and very little the next twenty-four. The first feed should consist of a very little millet, some fine grit and water. The latter should be so placed that it will be always cool and so that the chicks are unable to get into it to wet and chill themselves or soil the water. I feed a mixture of wheat, steel cut oats, millet and plenty of fine, sharp grit, five or six times a day for the first week, four or five the second week, and finally when about a month old, feed them only three times a day, and when six weeks to two months old only twice a day.

Now begin to give them coarse ground or cracked corn, dry, and they are able to stand any kind of sound food, as for instance, table scraps if not too sloppy or greasy, onion tops or other raw vegetables, chopped fine, so that they can eat them more easily. From now on they should do nicely if fed regularly a variety of sound food and given clean, dry quarters, free from vermin to roost in. Care should be exercised in the quantity of food and the manner in which it is given. It is better to scatter all food, so that the chicks will have to scratch and hunt for it and to feed only as much as they will eat up clean, for if too much is given at once, they will gorge themselves, which tends to make them lazy and brings on bowel complaints, nor will they take enough exercise. I do not believe that chicks will drink too much pure, cool water, if it is kept before them all the time, although some authorities maintain that water should only be given young chicks right after they are fed.

Flock of White Wyandotte Chickens, Property of Mr. F. C. Wilcox, a Breeder of Illinois,

Neither old nor young fowls can stand dampness and probably a greater number of early chicks are lost on this account, rather than from lack of proper food and care. Would advise that chicks be kept in floored coops at night until the ground is thoroughly dry, or until they are at least a month old. Many people make the mistake of putting too many chicks together after they are weaned and as they grow so fast they are soon crowded, before one has time to realize some of them do not appear to do well, and thus many a good bird amounts to nothing either for the market or the show room. Chicks of all ages should not be run together, if it is possible to avoid it, and all sizes should have plenty of shade and a grassy range, although they will do well in a bare yard if kept clean and judiciously supplied

with green food of one kind or another. Lice of many kinds are the worst foes of the poultryman, and in this case prevention is worth more than an unlimited amount of cure.

Clean the houses thoroughly each spring and fall, keep them clean between times. Whitewash the inside at least, and put coal oil on the roosts once a month or oftener. There are many good liquid and powder vermin killers on the market, but the former must be used with great caution, if at all, on chicks. There are certainly several successful ways of raising chicks, but they all contain as essentials, cleanliness, regularity, good judgment and perseverance.

J. A. LELAND, Illinois.

CARE OF THE GROWING STOCK.

Successful Poultry Raisers Herewith Give Their Favorite Methods in the Care and Management of Chicks from Six Weeks to Six Months of Age—Original Plans of Roosting Coops—Range for the Youngsters—What and How to Feed.

[In line with the symposium on "Feeding Young Chickens", we present the following additional methods in use among prominent breeders for bringing their growing stock to a vigorous maturity. The advice here given is of great value, as it is the result of experiment and observation by men whose successes qualify them to take rank among the foremost producers of good poultry.—Editor]

Colony Coop for Growing Fowls—Grass Runs and Shade—Conditions and Food That Produce Big Cochins.

Our chicks (Cochins) are hatched by both hens and incubators. We use outdoor brooders, called 200-chick size, and place from forty to fifty in each brooder. When the chicks are about six weeks old and are nicely feathered we divide them into lots of twelve each, keeping the cockerels and pullets separate. They are then placed in weaning coops, which are 5x6 feet, ground plan, and three feet high in front and two feet at the rear. (Fig. 1.)

These coops are provided with frame doors hinged on the inside and covered with one-fourth inch mesh screen. On the outside a solid wood door is hinged at the top. This door can be raised or lowered or closed entirely, as the state of weather may require. On warm summer nights the screen door is closed and the wood door is lowered and propped to provide shelter in case of a windstorm or blowing rain. This arrangement gives the chicks plenty of fresh air, and at the same time protects them from vermin and night prowling animals.

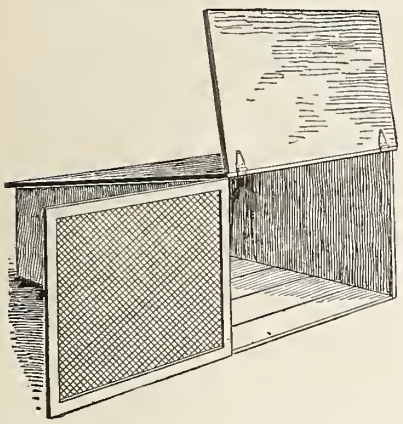


Fig. 1—Coop with Double Doors Used by A. W. Rudy & Son.

Having an abundance of green grass and shade, these weaning coops are almost constantly on the move. This reduces to a minimum the possibility of disease arising from accumulated filth, as is almost sure to occur if the chicks are compelled to live on ground saturated with poisonous excrements. During these stages of development they are given a thorough dusting of Persian insect powder once a week. This treatment we consider to be very important, as we have found by experience that lice cause more trouble than all other ailments combined.

From the ages of six weeks to six months the chicks are fed cracked corn, pure clean wheat, hulled oats, and at noon are given a mash feed of some good poultry food, and once a week we add to this ration, fresh ground green bone.

We never use any drugs or condiments and have no secret method of getting our Cochins so large, as we have found that if fresh pure food is used, combined with a little brains while using it, and the chicks are kept under conditions that will enable them to assimilate what is given them, their growth will be rapid and their development perfect.

We are very careful when selecting the chicks to make up a colony, to see that they are all of the same size and of equal development. If any show a tendency of going back, or slow development, they are immediately removed and placed with a younger flock, where they will have at least a fighting chance to keep up with the procession. When six months old they are placed in larger houses, the floors of which are covered with a thick bed of straw. Cochins have no use for roosts till they are at least one year old.

A. W. RUDY & SON, Maryland.

Raised in an Orchard—Allowed to "Have Their Own Way"—Variety of Food.

In regard to our care and management of chicks from six weeks to six months old, we have a large apple orchard near the house which has been fenced in and made into four large yards. A brooder house, or "summer home" for chicks has been placed on the dividing line between the yards, so that at this age we are able to separate the young pullets and cockerels, giving them separate yards and roosting places in the buildings. We have low flat, movable roosts standing on four legs, which are placed in the buildings soon after the brooders are removed, and here you will find our chicks at night until they are from one-half to two-thirds grown.

Some of them prefer the low branches of the trees which are so conveniently near by, and as we find it means constant warfare to compel them to seek the buildings, while they dwell in the orchards, we allow them to "have their own way" until the unpleasant fall weather sets in, when they are removed to winter quarters and sheltered at night. We have a "corn field" adjoining the yard in which the pullets are allowed to roam one day, and the cockerels the next. They always come home to roost and be fed. We usually put about as many in each yard as we can get of the same age and sex, varying from forty to seventy-five to the yard.

In the morning we feed a mash composed of equal parts of cornmeal, ground oats and wheat bran, with a little meat

scraps added, also a very little salt. Have sometimes used the H. O. poultry food in place of this mash. The mash we scald with equal parts of sweet milk and water, and feed while just a little warm. The chicks are given all the fresh skim milk and water they will drink, and a basin of "dutch cheese" is sometimes added to the mash. A little fresh cut green bone is fed once or twice a week if we can get it. At noon oats, wheat or buckwheat is scattered in the yards for them to hunt for, and at night they are fed all the wheat or corn they will pick up. They of course help themselves to apples in the late summer and early fall, and we occasionally give them cabbage and tomatoes to pick at after the grass gets dry, or any little "treat" we happen to have for them, to give variety.

C. W. JEROME & CO., New York.

Plenty of Runway and Yard Room—Chamberlain's Chick Feed—Lean-to Coop.

I use both incubator and hens for hatching. If the hens are slow in laying, requiring too long a time to supply a sufficient number of eggs for an incubator, I put the first two or three broody hens that I can find to work. I never set one hen singly. If the hens lay well I set the incubator. I much prefer incubators and brooders, especially the brooder. I have hatched out chicks by hens and raised them in brooders without any loss of chicks to speak of and with much less trouble than watching the old hen.

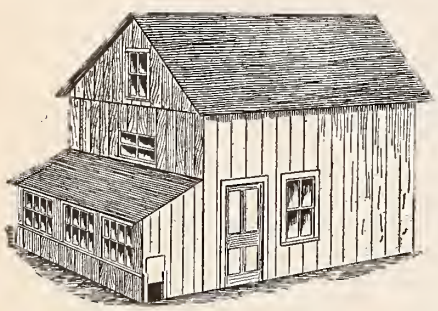


Fig. 2.—Style of Lean-to Coop Used by Mr. John Hettich.

I never use outside coops, even for broods with hens. I have on the south side of a main building a lean-to shed six by fourteen feet with a glass front. (See figure 2.) This shed I use for my young chick coop. I have movable partitions and can divide it into from three to five compartments, depending on the number and the size of broods, each compartment containing a brood of chicks. From this they can run on the outside in good weather either with the hen, or with the hen confined on the inside, so the chicks can run in and out at will.

In this coop they remain until they are weaned, which is from six to ten weeks. Of course this coop must be cleaned three or four times a week, with plenty of litter or chaff on the floor, with dry feed fed in litter to make them work, and plenty of fresh water. They grow and thrive from the very start. After chicks are weaned they are moved from this lean-to coop into the main room adjoining, which is 12x14. In this room they are put to roost, while other youngsters take their place in the first or young chick coop. The last lot of chicks I allow to grow up in this shed, while the first lot remain in the main room of the big building until about October 1, when the cockerels are separated from the pullets.

My cockerel house is in another part of the yard, with plenty of runway and yard room. Pullets go into my main hen house, which is 12x15, divided into two parts, with plenty of yard room to each part. I do not allow my hens and pullets to run together. I find hens get too fat on a ration that would keep a pullet starving hungry.

As to feeding chicks I find little trouble to keep them growing from the time they are six weeks to six months old on plenty of sound small grain, wheat and chopped corn being my main ration, Twice a week I feed them a full mess of wheat bran, middlings and oil-meal well mixed. I believe that oil-meal has a splendid effect in producing fine, glossy plumage. Of course, we all know that plenty of grit and fresh water are two essentials. It is the little chicks that give most trouble in getting them up to six weeks ald.

I am always making a fight on lice, both on fowls and in buildings. Lice kill more chicks and grown fowls, for that matter, than all other diseases combined.

JOHN HETTICH, Missouri.

Movable Coops in Blue Grass Pasture—Method of Feeding—Corn Field and Clover for Range.

I do not have any particular style of coop—a good roof and bottom of boards always, made so that it can be conveniently cleaned. Twenty chicks to a hen I think about right. The coops are placed near the house for convenience while the chicks are young, moving them further away as they grow older. At about five or six weeks they are located near a blue grass pasture, with a number of apple trees for shade. Here they have range until cold weather drives them into winter quarters.

My first food for little chicks is dry wheat bread, moistened with sweet milk. This is good enough for the first day; the second day, oatmeal and millet seed are given, with Mica Grit. They get water from the start. Up to four weeks old their food is bread, moistened in milk, millet seed, oatmeal cornbread, baked as for the table, and cracked wheat. After they are four weeks old I discontinue the oatmeal and bread and milk, and feed millet seed, whole wheat and cracked corn, with cornbread for breakfast, baked the day before. After the chicks are two months old I feed a bran mash, consisting of one-third each of ground oats, corn and wheat bran, moistened with milk, clabber or sour milk preferred. This I feed in the evening, all they will eat.

I follow this method of feeding the old fowls, believing the evening the proper time for soft food. For late hatched broods (say the last of June or first of July hatches) I know of no place better for cooping than near a corn field, with a clover meadow near by. The corn furnishes plenty of shade through the warm days, and the clover field supplies grasshoppers. I have had good results from late broods raised in this manner.

O. L. KING, Illinois.

Roosting Coop for Young Stock—Three Feeds a Day and Plenty of Range and Work.

In raising chicks, if they have been fed and cared for as they should, are free from mites and diseases until weaning time, or until they are large enough to be taken from the brooder to the roosting coop, I find that the greatest work and care of the season is over. After my chicks are six to eight weeks old I give them their liberty all through the day, except when the weather is too bad to let them run. I feed them three times a day and make them work for it all except the morning feed. For a roosting place I use coops with a floor space 2½ feet square. (Fig, 3.) I also use these coops with a run attached for the hen and brood when I let the chicks run with the hen instead

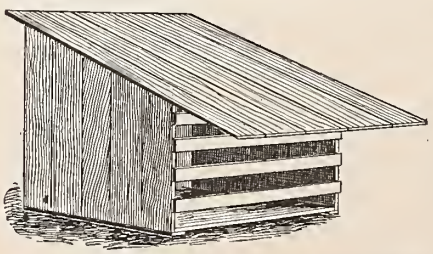


Fig. 3—Roosting Coops for Young Stock Recommended by Mr. G. E. Read.

of using a brooder, so when the chicks are weaned they will continue to go home to roost.

These coops are made of seven-eights inch matched lumber, well seasoned. The sides can be made of lumber taken from dry goods boxes. The front should be two feet high, the back sixteen inches high. This gives sufficient slant to the top to run the water off when it rains. The back is left open and has slats nailed across to keep the hen in and to allow the chicks to pass out. This open side admits plenty of fresh air at all times. The top should project over about eight inches at back of coop to prevent the rain from blowing in. In the front there is a door twelve inches wide. There is a bottom made by nailing boards together on two cleats, made so that the coop will slip down over the floor onto the ground. This prevents the rain from blowing under and wetting the floor. The cleats keep the bottom from resting flat on the ground. The coop should be given two coats of paint.

This kind of a roosting place is very easily cleaned or whitewashed by lifting it off the floor. When the ground is dry and warm the floor is not necessary, simply move the coop to a new spot when it begins to get foul. Twenty-five or thirty chicks can, without being crowded, roost in a place of this kind until they are three or four months old. When the chicks are raised in a brooder I prefer a roosting coop large enough to accommodate fifty. This number is as many as should be put in one flock until three or four months old. I then move them to a large roosting house, where they continue to roost on a floor until five or six months old. Sometimes I put as many as one hundred in a place of this kind. From here they go to their permanent roosting place, which is on perches made of two-by-four-inch scantling, with the top rounded a little. Whatever kind of place chicks have to roost in, it should be kept clean and free from mites. Unless you do this you will surely fail.

I have no mechanical arrangement or fixed method for feeding chicks. I always feed what I think the time and occasion demand, I believe that as much depends on the way food is prepared and manner of feeding, as on the material. For the morning meal I usually give a light feed of cornbread baked just the same as for table use, or a mash composed of bran and middlings. They will still be a little hungry, and will start out hunting what they can find to pick up. Along toward noon I scatter wheat among the leaves and litter in a large part of their range. This gives them something to do that greatly interests them until along in the afternoon. When the sun is about one hour high I scatter cracked corn, and perhaps some millet seed or wheat in some litter. This will keep them busy until about sundown, and by this time their crops are full, they have done a good day's work and are ready to go to their coop and enjoy a good night's rest.

There is always plenty of fresh water and grit where they can go to it whenever they choose.

G. E. READ, Missouri.

Rat and Storm Proof Roosting Coop.

The brood coop I have had most success with is made as follows: Length, 24 inches; height in front 20 inches; rear, 12 inches; width, 18 inches (inside measurements). I make the coop of matched pine, with board floor, the cleats being on the outside. so as to raise the coop off the ground. The top projects three inches at the sides and four inches at the rear. I make a closed front (boards the same as the coop), the front being hinged to the top, and the top and front mitered, so as to close tight when down. The coop front is kept in place by cleats on the inside, these cleats allowing about seven eighths of an inch space on both sides for ventilation when the door is down.

The front has iron strips with three or four holes fastened about the center for the purpose of forming a hood to the coop, which can be set at different angles by placing screw eyes to the sides of the coop. This feature of the coop is grand, as by the hood the hot sun can be kept out as well as driving rains.

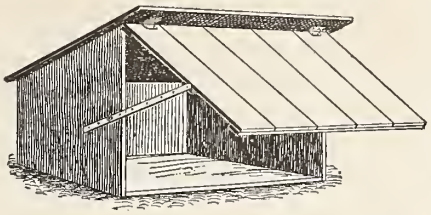


Fig. 4—Coop with Adjustable Hood Front.

These coops save me many chicks each season. They are rat proof and storm proof. The hen is kept in by a lath front fastened just at the edge of coop. By painting these coops and storing when not in use, they last a long time and repay for their cost many times over. When the chicks are older I utilize dry goods boxes, cut down to about the same shape, only I make a hood of the lower eighteen inches only. REV. C. A. SMITH, Wisconsin.

Roosting Coop for Stock until Ready for Winter Quarters—Making the Mash—Grain Food.

As soon as the hen weans the chicks (or if raised in a brooder, as soon as they are large enough to take care of themselves) they are removed to roosting coops made and used exclusively for this purpose. These coops are scattered along a hedge fence facing a large orchard, where they can get range and shade at all times. The coops are made from cheap lumber, but are strong and tight. We have them from six to ten feet long, but prefer them ten feet long, two feet high at back, three and one-half feet in front, the roof projecting over the front to keep out rain. Ends and back are boarded tight, and there is also a tight floor. Front is of wire netting nailed to the frame just fitting, and hinged at the top, so as to be closed at night and to shut the chicks in when getting them used to new quarters. The coops have roosting poles lengthwise the whole length of coop. We do not find so many crooked breast bones from roosting on these poles as are found by chicks roosting on the floor. The coops must be kept far enough apart so the different flocks will not try to crawl into one coop. If possible we put pullets in different quarters from the cockerels. We have kept chicks in these coops until snow flies.

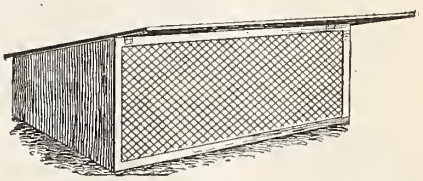


Fig. 5—Mr. F. E. Mow's Roosting Coop.

We feed only three times a day when chicks are this age. The morning and noon ration consists of corn meal (ground fine) two parts, bran one part, middlings two parts, thoroughly mixed. To this we add salt and to a peck we add one quart of meat meal. This is placed in a light vessel, boiling water poured over it and mixed to a stiff dough. We use a grain sack to cover the vessel, and pack very tightly to keep in all the steam. Let the mixture cook in its steam and feed only when cool. They are fed all they will eat up clean. At night they are fed corn, wheat and oats—very little oats, however, as we have had poor success with oats. The grains are fed alternately so they will not get tired of either grain. F. E. MOW, Indiana.

Excellent Conditions for Growing Healthy Birds.

Living as we do on a farm, we have plenty of range, grass and shade. We have a large apple, plum and cherry orchard, also raspberry and blackberry patches, which afford fine range for young chicks. As for food, we use only such grains as we raise on the farm. When the chicks are about six weeks old we put them in flocks of fifteen to twenty-five, each flock roosting at night in a large coop having a movable bottom, so as to make it easy to clean out. There is a wire screen door in front, so as to give plenty of air, also to make it vermin-proof at night.

As to our method of feeding, we give corn ground rather coarse, so the chicks will have something to pick at. Each morning we take what cornmeal we want for a day and moisten it with milk that has been heated to the boiling point, being careful to mix thoroughly so all the meal is scalded, thus preventing danger of bowel trouble. We feed three times a day just what they will eat up clean each time.

When they are about three months old we omit the corn meal and give whole oats in the morning and noon, and whole corn at night. We let them forage through the day for bugs, grass, etc., which they need to keep in good growing condition. There is plenty of good clean water for them to drink at all times. This is one of the most important parts in raising healthy chicks. H. TIBBETTS, Illinois.

Best of Care—Plenty of Food—Well Ventilated Coops.

We give our chicks farm range (farm consists of 269 acres) and plenty of fresh well water, also a variety of food consisting of cracked corn, wheat screenings, cornbread, potatoes, etc., and plenty of natural grit from a gravel bank. In autumn their range affords a good supply of grasshoppers. We sweep the feeding space each day, scald and clean the drinking vessels, and try to keep the chicks as free from lice as possible by keeping the floor of the roosting houses clean and the walls, etc., whitewashed frequently. We aim to give at all times the best of care and plenty of food. We keep our fowls well sheltered at night in well ventilated roosting houses, ranging in size from 4x8 feet to 6x12 feet. The illustration (Fig. 6) shows a building 6x12 feet; front, 6 feet, 6 inches; rear, 4 feet. The roof projects one foot to protect ventilators from rain. The door (D) is two by six feet. C C are doors twelve inches, hinged at bottom, to be opened for light and thorough ventilation. Above this door is a wire screen six inches wide (B) for ventilation at night or when other doors are closed. Above the door, running full length of house, is a board four inches wide to give support to roof. SIMON LYNCH & SON, Indiana.

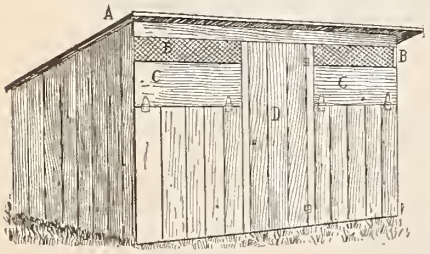


Fig. 6—Coop Used by Simon Lynch & Son.

Farm Range—Plenty of Green Food—Roomy Quarters.

We have never aimed to raise over four or five hundred chickens a year, as we raise geese and turkeys and cannot accommodate a much larger flock. The young have good comfortable coops, with board floors, closed up according to the weather, with the brood hen confined accordingly. They have farm range, an abundance of grass, good water at all times and plenty of grit. Our coops are too small to accommodate them after they are quite large, so as soon as they begin to think about roosting on top of coops or a limb of the nearest tree, we put them in our large buildings, where the most of them are to be kept through the winter. Most of our old stock, kept for sitting, laying, etc., has been marketed by this time.

Our buildings are clean and free from vermin. The youngsters, if they like, can use the perches, which are two inches wide and have rounded edges; or they can roost on the floor, which is earth, thickly covered with straw. There is plenty of room either place, with no crowding, (chicks won't crowd if comfortable). When the cold rains and winter snows come unexpectedly they are comfortable. They are free from colds, nor do they have crooked breasts as some might think, for they do not have to go on the perches till they want to. We have had to put as many as one hundred and fifty in a large room, but that is too many; fifty to seventy-five are better.

These chicks are taught to roam and scratch when quite young, and are not over-fed on grain too easily gotten. When past their chick food they are fed twice a day with a mash consisting of cornmeal, middlings and bran, about equal parts, scalded and salted. A third meal, the night one, consists of cracked corn, wheat or screenings, fed in the straw so that they have to work for it. A little meat in some form is fed every few days, and they are given anything in the form of vegetables, cooked or raw, that they will eat that we happen to have, and we usually have something of the kind. Our large orchard and grove furnish an abundance of shade, some times too much when it is a little cool. We never neglect the young, nor feed them more or less in quantity than they require, which varies according to age and weather, and no one but the feeder can tell how much. We used to overfeed, which is easily done, though some people actually starve their poultry and of course have "bad luck," while the real cause is death from neglect.

We do not expect to raise every chick, but are satisfied with a good per cent. We lose but few after they are placed in the large buildings, and those are by accident. This season we expect to keep many of the incubator chicks in the brooder houses till late fall or winter. The flocks spoken of were raised by hens. B. F. HISLOP, Illinois.

A Cool and Safe Coop for Forty Young Fowls—Moved to Fresh Ground Weekly.

I have several coops for young chickens that are 2½ feet high at back, 3½ feet in front, 3½ feet wide and from 6 to 8 feet long, with heavy, water-proof paper on top of roof. I try to set from three to five hens at one time and put all the chicks with two or three of them in one of these coops. When the chicks are about a week old, if the weather is good, I let them out. They will return at night and when weaned will roost in these coops of their own accord. Then I make a frame in front (two feet wide) covering it with poultry netting (small mesh). I leave an opening in the back eight inches wide above the roosts and cover with wire netting. The fowls are then safe from minks, rats, or any other animals, and

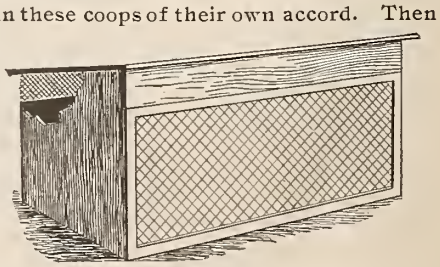


Fig. 7—Mr. D. F. Palmer's Movable Coop For 40 Birds.

still have a circulation of fresh air. The roosts in coop are about a foot from the ground.

I clean the coops once a week and set them on fresh ground. These coops will accommodate about forty chicks. Late in the fall I line them with paper to prevent drafts, and when cold weather comes they are in fine shape to go into the houses. As to food, I am feeding small shrunken wheat from the mill. Of course fresh water is before them at all times. D. F. PALMER, Illinois.

Farm Raised and Vigorous—Forage for Green Food and Insects.

I have found no better food for a chick's start in life than bread soaked in sweet milk (new milk preferred), and pressed as dry as possible in the hand. I give this exclusively for the first two or three days, then give millet seed once or twice a day and when a week old make millet seed their principal food, varying it with hard-boiled eggs, bread, cornmeal baked in a loaf, in which eggs, table scraps and a small quantity of beef and bone meal are used. As the chicks become old enough to digest them, wheat screenings and cracked corn are given until they are given wheat and corn almost exclusively. My chicks are farm raised and have large range where they can provide themselves with plenty of grit and green food. They are provided with plenty of clean water, are kept free from lice and are given good dry quarters.

If the weather is warm and the ground dry, the hens are let out with their broods when a week old to forage during the day. The coops can then be turned over to air and sun. For coops I use the old-fashioned gable roof, or dry goods boxes. It makes little difference so they are dry and roomy. The bottoms are removable and can be drawn out when warm and dry. I have feeding coops made of lath, the coops being placed in the center of a village of about a dozen coops, the food placed in them as soon as the chicks begin to leave the coop. Many a dainty morsel can be placed in the coops that would otherwise fall to the lot of the hens.

Chicks are allowed to sleep beneath their coops until they show a desire to roost, when long roosting boards are placed from coop to coop, and not until the weather becomes quite cool are they removed to the buildings.

MRS. L. D. YOUNG, Illinois.

Feeding the Chicks.

We have had experience in raising chicks in brooders for many years and we have been successful. We never put more than seventy-five chicks in a lot and we use the dry food method entirely. Some years ago we found that it was not possible for us to give the chicks the time necessary to success, as our fruit business at times claims almost all our attention. We therefore dropped the brooders, retaining our incubators and giving the chicks to broody hens, placing the hens in the house formerly used for brooders until the weather allowed us to put them outdoors.

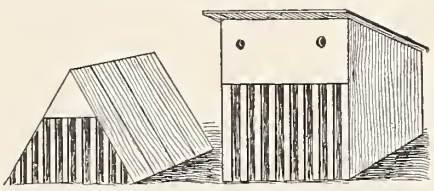
The method of feeding which we employ for chicks after being fed for a week or so on crumbs, boiled rice, etc., is for morning: One quart sifted cereals, ground fine, one pint wheat bran, two ounces meat meal and moisten just enough to adhere slightly together. Noon, feed cracked corn, barley, hulled oats. Feed just what they will eat up quickly. At night we feed cracked corn, hulled oats, wheat, and a mixture of any small grain we may have. We find that the meat meal has been a great help, and all our chicks made splendid growth in bone, and we have not the proportion of puny birds that are so common in nearly every flock.

We prefer hen-raised chicks for many reasons, and we will name some of them. First, you do not get so many crowded in a bunch; second, the hens exercise them hunting bugs and teach them to hunt for something to eat instead of lying around waiting for the feeder to come; third, our hens will average ten chicks each and thirty hens will raise us three hundred chicks, which is as many as we wish for our present quarters. We give Game hens Game chicks, as they will hover them until full feathered and raise nearly all given them. White Wyandottes leave them in six or seven weeks to do for themselves, and they get colds and the attendant diseases and die off. We would rather raise one well developed chick than twelve poor ones, and by our method we have few culls. We do not approve of brooders for breeding stock. We know that chicks can be raised in brooders. We have done so successfully and we say to everyone that they can do so if they give the careful and assiduous attention that is necessary. Thoroughness will crown your efforts in any walk in life, and the chicken business is no exception to this rule. Trusting we are not wearisome with our little speech, and wishing you success, we are, Yours truly,

S. D. & J. W. RILEY, Ohio.

Three Good Coops—Moving the Young Stock—Cooked Food and Grains.

I send a pencil sketch of coops used by me. No. 8 is the old A coop for hen and chicks. I have found this to be about as satisfactory in the long run as more expensive ones. No. 9 is a little more expensive and if made right is very convenient, easily kept clean and safe from night prowlers. I often make use of these coops as a half-way house from the brooders to coop or house No. 10, as I can limit the number of chicks to suit size, weather and other conditions. If the weather is cold and damp I often use a jug of hot water, set in the middle of the coop. It is a good thing and the chicks appreciate it, as one can soon tell.



Figs. 8-9—Half-way Coops to Use Between Brooder and Fig. 10.

I use one incubator, and with it I have three brooders—No. 1, 100-chick; No. 2, 300-chick; No. 3, 500-chick size, so-called.

They go from the incubator to brooder No. 1, which I have ready for them with a temperature of about 90 degrees to start with; from No. 1 to No. 2, then as age and size warrant they go to No. 3. No. 2 has outside runs; No. 3 is an outdoor brooder and chicks have a good grass yard and plenty of shade. I bunch them up in small colonies of about fifteen in the No. 9 coops. Fresh water and grit are where the chicks can get to them all the time.

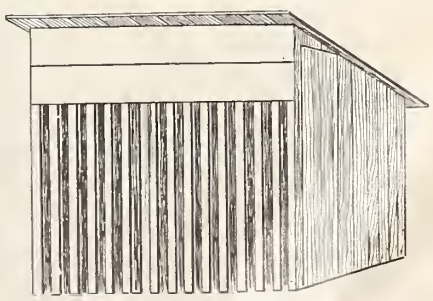


Fig. 10—Slatted Front Coop with Door at Side.

The food question is one that bothers me more or less. All my fowls, old or young, get one cooked ration every day—in the mornings. For this I use oats, corn chop,

clover (cut), bran, shipstuff and beef or blood meal. This is prepared the night before, and as soon as the young stock get old enough they get a portion, the same as the old stock. I feed corn chop, wheat and millet, green cut bone and vegetables, table scraps, and anything I can find that is good for them. I aim to give my chicks as much variety as possible. Oat groats is a principal factor in my food for growing chicks. E. M. DURHAM, Missouri.

BEST BREEDS FOR BROILERS.

Valuable Points on Broiler Raising by a Man Who Achieved Success in this Line—The Merits of the Light Brahmas, Leghorn-Brahmas Wyandotte-Brahmas, Barred and White Plymouth Rocks and White Wyandottes Set Forth.

BY ARTHUR G. DUSTON, BREEDER.

AT THE request of the editor I am going to present to the readers some hints on broiler-raising as exemplified by me on my farm. I have thought best to divide these into two papers—one on varieties and their comparative values, the other on forcing for growth. I believe that many lose courage in raising broilers by not obtaining the right stock at the start.

First, many try Brahmas. They might do far worse. Let us take the Brahma from the egg and follow it. Mr. Felch says Brahmas are superior for this purpose. Yet, in an argument with an incubator manufacturer his first and best-proved claim is, that they do not hatch as well artificially as eggs from the American or Mediterranean classes. Does it pay to put eggs in machines that will make the chicks cost, on coming into the brooder house, 25 to 50 per cent more than others?

Once in the brooder, Brahmas prove very strong as little chicks, but look out for leg-weaknesses, their heavy bodies proving too much for small legs.

Again, anyone watching chicks raised artificially knows that they will attain their height earlier than those raised with hens. So a Brahma chick has that against it as a broiler, for long legs with feathers on them hurt a broiler in the market. But properly taken care of, Light Brahmas will prove fairly satisfactory as broilers. As roasters, which subject cannot be even touched on in this article, they are choice.

While the Brahma is under consideration it seems well to take up two of the more popular crosses made with them, viz: Leghorn on Brahma and Wyandotte on Brahma.

Leghorn on Brahma have some very good points which are: Yellow skin and legs, fairly plump bodies, and they also feather early, but a large proportion of the early cockerels will be so near full blood Leghorn that they would easily be taken for them by a casual observer, and to force them, giving a liberal quantity of meat or ground bone, together with the heat, will develop extremely large combs, which gives the appearance in a dressed bird of its being old—a point against us. Furthermore, the nervous temperament of this cross (taken from the Leghorn) keeps them from making flesh, where other varieties would take on fat.

I have run this cross where at fifteen weeks I could not force at least twenty-five per cent of them to weigh more than from one and one-half to one and three-quarters pounds.

The Wyandotte-Brahma cross is almost ideal, being hardy, low-combed and not getting "stagy" at an early age, as with the Leghorn cross; but, my dear reader, do you know there is something to the feathered leg that is not inviting to the buyer? To see a neat, yellow breasted broiler with a mess of feathers on the legs and feet will detract from its appearance more than one would think unless he has had the very fastidious market of Boston to cater to.

The carcass of this cross is plump and yellow, only a small proportion coming so dark as to have black pin-feathers enough to injure the looks.

To leave the Asiatics, we will touch on the Barred and White Plymouth Rocks. The rich yellow legs and bodies of these justly popular fowls, the quick growth, with not enough comb to hurt, gives us a broiler hard to beat—one of the worst faults being dark pin-feathers in the Barred, which are always somewhat objectionable in a broiler, for the reason that they are put on the market at an age when it is impossible to get them all out.

I can not go through all the breeds, but will only take up those I have honestly tried. This brings me to the last, the White Wyandottes. To be frank, I will state that I once thought of discarding this breed as not fitted for my business purposes, but after "summering and wintering" them I now feel that I would drop all other breeds before I would the reliable White Wyandottes.

Let us note their faults. The first is that in some birds, more especially those bred for extreme whiteness, you will find they are not yellow-meated. At the same time I have seen the whitest plumage birds have rich, yellow skin, beak and legs. In buying stock look for yellow beak, and as yellow a leg as you could naturally expect at the time of year you are buying; that is, make allowance for a bird hived up in a yard, with sand to dust in, as it will surely bleach the legs to a flesh color.

Another trouble you may have with the Wyandotte, as perhaps you would have with no other breed, is, when confining a large number in a small pen they easily take up feather-pulling. I think this is due to the peculiar way in which they feather. Some will grow to weigh one and one-half pounds before they have any but neck and wing feathers. Then the pin-feathers start all at once, making the habit easily formed by the "chicken act" of striking one another, or picking off any soft food that may adhere to the feathers. But plenty of green food will obviate that to a great extent, especially should that food be freshly cut clover. Of course it can not be obtained in winter, but well-cured clover rowen can. With care after this warning you need have no trouble in this direction.

Regarding white skin, I will tell you in my next paper how to overcome that by the use of the right kind of food, making it yellow enough to suit anyone. Now that we have seen the faults of the White Wyandottes in their worst light, let me extol their virtues as broilers, for they have many.

The eggs being reasonably thin shelled hatch as well as any you can get.

They mature as laying pullets a full month earlier than Plymouth Rocks, thus giving you eggs for early hatching.

Their clean, yellow legs, low combs, white pin-feathers, and quick growing qualities, render them the best broilers I can put out.

I sold hundreds to dress eight ounces (one-half pound) this year and they were as round as a "butter ball;" this being one of their most important merits, that when properly fed they are at all times ready for market.

Again, they will stand all the forcing any chick can. If you try to raise Rocks and Wyandottes in the same pen, the experiment will prove to you this fact. Your Rocks will go "off their legs," while the deep-breasted, plump-bodied, smooth-skinned, active little Wyandottes will take their medicine five times a day and stand as straight as matches. Remember, it is generally the bird that can stand the greatest amount of food that makes the quickest grown broiler, and must be the bird you should adopt, as every additional day means additional cost from labor, coal and feed.

I have written this article from the market point of view, that is, the sales-counter, as that is where our returns for broilers come from.

Now, for one moment let us look at the matter as epicures. Take any one of the varieties mentioned above, and the Wyandotte, besides having the extra flesh on breast, as I stated before, caused by the great depth of breast-bone, is as juicy and delicious as any, and, in the opinion of "our folks," more so, a dish luscious enough for a king.

This is just my experience briefly set before your readers. If I have written anything that will in any way aid my brother poultrymen, I am satisfied.

One word in closing. Do not be in a hurry to cross your stock, as no one can make me believe again that there is anything gained by crossing, for there is no place that a thoroughbred of some variety will not fill the bill, and once you start to cross where can you stop? The labor and skill of years come to naught when you destroy the integrity of a breed or strain by crossing.

THE INCUBATOR CELLAR AND THE NEXT BEST PLACE.

THE sole idea in building an incubator cellar is to control the atmosphere surrounding the machine so that there will be no external influences at work to affect the temperature of the egg chamber. To secure best results an incubator must be placed where there is little change of temperature from day to day. The incubator is an inanimate thing. It has no control over itself and so cannot be compared to the hen that hatches chicks in a manger when the thermometer is hovering around zero. The colder the weather, the closer the hen sits to keep the eggs warm, and if the weather becomes extremely hot she stands up and cools them off. The incubator cannot of itself guard against extremes of heat and cold, and so it becomes necessary that the operator should do so. Why not turn the lamp higher or lower to counteract external influences? Because that would not be following closely the teaching of nature. To raise or lower the temperature of the egg chamber takes time. Did you ever notice after having turned the eggs and replaced them in the machine how long it took to bring the thermometer up to 103 degrees, the point at which it formerly stood? Yes, and very likely you turned the flame of the lamp higher or placed a weight on the regulator to get the thermometer up to the proper notch, and then you had to open the door of the incubator to cool it off, it ran so high. When a hen returns to the nest her temperature is no higher than when she left it. The eggs which have "cooled off" resume their original heat gradually, and observation of these things teaches us that the temperature must be fixed and remain fixed, and that the eggs are all right in a chamber regulated to 103 degrees even if the thermometer does not register the wished for figure immediately upon replacing the eggs in the machine, also that not only must the operator avoid interfering with the temperature in this way, but he must guard against interference by atmospheric changes. That is why poultrymen build incubator cellars. The fact that a hen hatches chicks in a changeable atmosphere is no proof that she would not have done better under improved conditions. In fact we know the best hatches are made at a season when the temperature varies but little. Where are atmospheric changes least liable to be felt? Under the ground. Then that is where the incubator cellar should be built, yet not so far beneath the surface as to interfere with the purity of the air. Even temperature and pure air, free from excessive moisture or dryness, are the requirements of an incubator cellar. The lamps give off an amount of foul air that envelopes the machines, ventilation therefore must be perfect.

The majority of incubator cellars are built in great part below the surface of the ground, often in the side of a hill.

How to Build an Incubator Cellar.

It costs only a small amount of money to construct a first-class incubator house, or half-cellar, such as is commonly used on extensive poultry farms in the eastern states. On page 68 we show a sectional view of an incubator cellar. The exact plans for building such a cellar are at the discretion of the person chiefly interested, but in the way of general directions, we submit the following:

Choose a well-drained location, free from seep-water, and excavate to a depth of two or three feet. Two feet is ample. For the walls brick or stone can be used. If these are not available, hardwood or even pine plank will answer first-rate, except that they will not be as lasting. Where the ground is dry, plank will last for years. Build the side walls up to the height of four or six feet, as desired, having these walls half way below and half way above the surface of the ground. Build the end walls up to a peak to fit closely under the roof.

The roof will need to be well built. Use for the roof 2x6 pieces, and if thought necessary, brace it with two uprights, one placed at each end of the fairly good-sized skylight which is placed in the center of the roof. Cheap sheeting will answer for covering the roof. On this place six inches of loose straw; on the straw throw from six to ten inches of earth—that excavated—and pack it down well. Use double windows for the skylight, leaving four to six inches between them, and protect the top one with a wire screen. It is no doubt best to have a double, or vestibule door, as there will be less loss of heat when entering and coming out, but this precaution is really not necessary. The floor can be of the natural earth, or cement, as desired.

An incubator cellar built as above will preserve a remarkably uniform temperature, regardless of outside atmospheric changes, and in such places hot air and hot water incubators are on a par—both naturally being at their very best. On the large eastern farms the incubator house or cellar is considered of first importance in the matter of successful incubation, and where persons in the west, northwest or south think of embarking in the business on a large scale, we advise the use of a regular incubator cellar similar to the one here described.

Persons who use only one or two incubators may not desire to go to the expense of building an incubator cellar, in such cases they must choose the next best location. Sometimes this will be found in the cellar beneath the residence; at other times a spare room in the residence, and during warm weather an outhouse may be utilized.

In using a house cellar the chief considerations are freedom from excessive moisture, and a plentiful supply of pure air. Even a hen set in a damp cellar will not do well. If the cellar is properly ventilated, that is if the air is continually being changed without too great variation in temperature there will always be sufficient moisture in the air. The fact that a thermometer in the cellar remains at or near the desired point is not proof that conditions are right. Foul air may be regulated at the same temperature as pure air, but chicks fail to hatch when the machine is surrounded by it. The incubator is not intended to purify the air, it is simply arranged so as to allow air to circulate through the egg chamber, and is of course dependent upon the air immediately surrounding it. Therefore keep the air fresh.

If the incubator is placed in a spare room in the residence, it is not wise to have one end of it near a cold outside wall or window and the other towards a fire. The passage of air through the room will not affect the hatch unless the incubator comes within the direct draft, its effect would then be to keep one side of the incubator cooler than the other, and to cause a variation in the lamp flame.

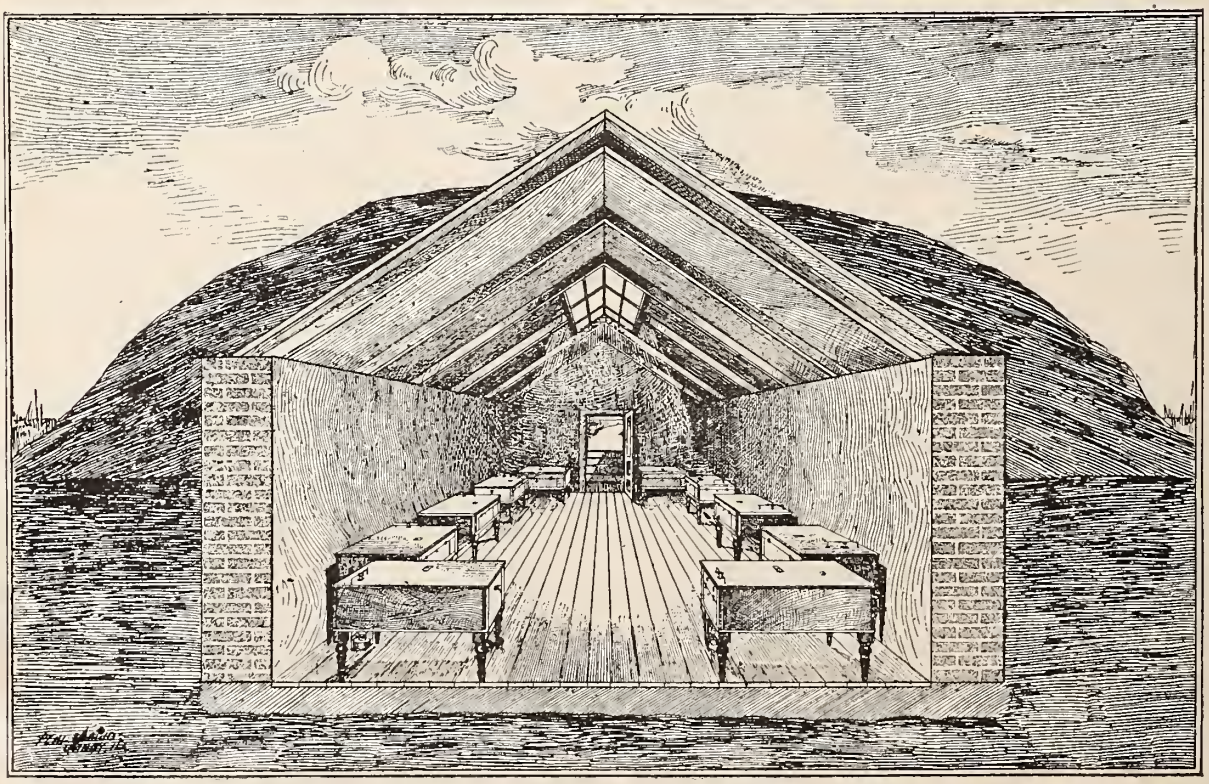
There is little difficulty in avoiding these things. They do not call for a high degree of intelligence, simply the exercise of common sense. An incubator is an easy machine to manage; it calls for no great effort of the brain to run it, in fact a good incubator will run itself if it be once adjusted and the supply of oil kept up.

An incubator like an egg is often misunderstood. They will both stand more abuse than some persons imagine. We have known of an incubator that was operated by means of furnishing a regular supply of hot water and drawing off the cold. It was in a kitchen and during the period of incubation the housemaid used it for a shelf, sometimes as a table upon which to wash the plates, etc., and even then a fair hatch was secured. The hatch would have been better, but it was discovered that to save time, the housemaid, when she required eggs in a hurry took them from the incubator and put in others later on. As incubation progressed and the eggs became unfit for table use, inquiry was instituted which elicited this fact. Needless to say, this incubator was strongly built. We wish to remind our readers that this was one of those stray cases that sometimes happen on similar lines to that of the hen that brings off her brood in zero weather, but it is not advisable to follow such an example, nor to put the incubator to a use for which it is not intended.

Do not experiment. The manufacturers of incubators have done that and we must give them credit for knowing what treatment is best suited to their machine. Read carefully the book of directions that is sent out with each machine and then follow its instructions. If it says put in moisture—put it in. If it tells you no moisture is needed—leave it out. These things are regulated by the ventilation, and as we have said the manufacturer knows what his machine requires.

General Directions.

A cellar is a capital place in which to run an incubator, plain style, without top brooder. A brooder containing chicks has no business in a cellar, cave, or other sunless apartment. Growing chicks, like growing plants, must have pure air and plenty of sunlight. If your machine is an incubator and brooder combined in one, or if you have an incubator and separate brooder, and wish to operate them in the



Style of Incubator Cellar Used on Large Plants.

same apartment, use a south, southeast or southwest room, placing the brooder where direct sunlight will reach the chicks part of the day—the more the better.

Before putting the eggs in for the first hatch run the machine thirty-six to forty-eight hours until it becomes uniformly and thoroughly heated; then readjust the regulator; make sure it is in proper working order, and put in the eggs. Don't be nervous during the hatch. Take things coolly. Be watchful. Use your headpiece—that is what counts most in this life in any field of effort. To be sure, thinking is a good deal like work, but we need it in our business if we are to succeed well. Don't be easily discouraged; what scores of others are doing you can do. If you have a good incubator located in a suitable place, that is in working order and is properly run, you should be able to get satisfactory results. Don't give up.

Know as near as you can just what your eggs are. Get them from stock that has plenty of range, plenty of exercise. Reject the small pullet eggs, the large double-yolked eggs, those with rough or thin or mottled shells. After the third day turn the eggs twice a day. Take your time to it. Cooling them will not hurt them until they begin to pip. Chilling the eggs then, or chilling the newly hatched wet chick is very risky; do not do it. When the eggs begin to pip, see that a liberal amount of fresh air is supplied through the bottom ventilators, but do not open the egg chamber until the hatch is about completed. Even then handle the chicks rapidly (if the atmosphere of the room is cold) and close up the machine on the remaining eggs as quickly as possible. Treat these little chicks about as you would a newly born babe and the proper thing will be done. They simply must not be chilled at this tender age or congestion will result and bowel trouble end their lives.

Do not sprinkle the eggs. This lowers the temperature too suddenly and is therefore hurtful. If the machine, through some cause runs up too high, dampen a towel or cloth in warm water and spread it out over the eggs in the tray, leaving the tray in the egg chamber, but not closing the egg chamber door. Should the heat run up to as high as 112 degrees you may still save the hatch by the above plan, providing the excessive heat was not applied too long. At two weeks old the chick embryo will stand more of such abuse than when only one week old, and after the two weeks, handling, jarring, etc., do much less damage than during the first days of the hatch when the chick embryo is first taking form. Be governed accordingly.

As a rule, incubators that are run in cellars where there is no furnace or stove, require very little moisture until the dry summer months come. Most cellars, caves and basements are moist, providing there is no fire in them. Top ventilation we do not believe in, and if we had an incubator with top ventilation we would keep the top vents closed all the time. If you have such a machine, and are not having success with it, try a hatch with the top vents closed.

INCUBATOR POINTERS—THIRTY-TWO OF THEM.

BY P. H. JACOBS.

1. Hatching chicks with an incubator is a winter pursuit.

2. The hen seldom sits in winter, hence she and the incubator do not conflict.

3. Hens that lay in winter can not produce as fertile eggs at that time as in the spring, for the cold season prevents exercise, the hens become fat and the pullets are not as fully matured, while the male, if he has a frosted comb, suffers from cold or becomes too fat, and is unserviceable.

4. Do not use extra large eggs, or small eggs. Have all eggs of normal size and of perfect shape.

5. Do not be afraid to watch your incubator. It pays as well to keep awake at night to watch a hundred chicks hatch out as it does to keep awake to save a $5 calf from loss when it is dropped, and the chicks are worth more than the calf.

6. No incubator has brains. It will regulate, but can not think.

7. When chicks die in the shell the chances are that too much of a draft of air passed over them. When a hen is hatching she will fight if even a feather is lifted from her. She will not allow the slightest change of temperature, and she will hatch as well in a dry place as in a moist location. Pure air is not injurious, but drafts of air cause rapid evaporation and loss of heat.

8. Dry, warm nests in winter, and moist nests in summer is an old proverb, hence the moisture depends on the season. Less is required in the incubator in winter.

9. As the chicks progress in the eggs they give off heat, hence be careful of the lamp, hot water, or whatever the source of heat may be.

10. Too much moisture covers the eggs and excludes the air from the chicks within the eggs.

11. No currents of air can pass through an incubator without a plentiful supply of moisture, but in incubators that have no currents but little moisture is needed.

12. Do not take out the chicks until you believe all are hatched. Leave the chicks in the incubator. If you take them out the heat will suddenly drop, and you will also let in the cold air on the eggs. Never disturb the eggs when chicks are hatching. Better lose a chick or two by trampling than all.

13. Test your incubator with moisture, no moisture, plenty of air, and air shut off, as each incubator may differ from the others.

14. Eggs will be aired sufficiently when they are turned. It is of no consequence to cool them.

15. If the chicks do not hatch out by the twenty-first day your heat was too low.

16. If the chicks begin to hatch on the eighteenth day your heat was rather high.

17. Do not put eggs in at different periods during the hatch, and do not hatch ducklings and chicks together.

18. The same rules apply to the eggs of hens, ducks, turkeys and guineas, as regard heat and moisture.

19. Never sprinkle eggs. It lowers the heat instantly (due to rapid evaporation), and sometimes kills the chicks in the shells.

20. If the incubator shows moisture on the glass do not open the egg drawer until it is dry. Cold air and dampness kill the chicks, the heat being lowered by rapid evaporation.

21. The reason the hen that steals her nest hatches so well is because you do not give her all sorts of eggs, such as large eggs, small eggs, and eggs from old hens and immature pullets, such as you put in the incubator.

22. Send away the curious visitor just when your eggs are hatching.

23. Keep the incubator in a place of moderate temperature. A window on one side will make that side cooler than the other.

24. Do not expect to hatch without work. The man who expects to get chicks by trusting to the regulator to keep the heat regular does not deserve success. Work is required for other stock that need winter care, and the artificial hen is no exception.

25. Begin with one incubator and learn before you try more than one.

26. No matter how much you read, experience will be the best teacher.

27. Have your incubator warm before you put in the eggs.

28. A child can not manage an incubator, all claims to the contrary notwithstanding. Incubators are not toys. Do not turn over a man's work to a boy.

29. Let the bulb of the thermometer touch a fertile egg.

30. In winter the hen will not hatch over one-half of her eggs nor raise over one-half of her chicks. The incubator and brooder, if skillfully managed, will do better than this.

31. In a majority of cases the failure is due to the eggs and not the incubator.

32. Above all, follow the directions you get with your incubator. Do not try any of your "ideas," as it may be costly experience.

FEEDING AND FORCING BROILERS.

Second Article by Mr. Arthur G. Duston—The Facts He Presents Have Cost Him Many Dollars in the School of Experience.

We will say that we have decided on the variety that we will run; our eggs are as fresh as possible and of uniform size; we have put them into a well made incubator and with proper care have gotten out a good hatch, which came along promptly, so that the morning of the twenty-second day we find the chicks nicely dried off. We now get our warmed, cloth-lined basket, with a heavy cover or shawl to prevent them getting chilled.

Right here I want to say, I believe more chicks "pass out," as our Christian Science brethren would say, to the land whence no wanderer returns, from getting chilled in moving them from a warm, moist incubator on a cold day into the brooder than most folks are aware of, and those little fellows you had such fond hopes of, but lost last winter with what you called bowel trouble or diarrhœa, were really chilled in being changed from their birthplace to their temporary home.

Well, we have got them safely, we hope, into the brooder, which has been brought up to the temperature of the incubator. Of course we have placed our board in slides about a foot away from and in front of the hover, so that the babies can not get out in the long pen and not be able to find the way back and thus get chilled. Just bear in mind for the first week that to keep them warm is more essential than the kind of food.

The first day of their lives in a brooder has almost passed and they have not eaten anything. Night has begun to come on and it is time to feed the hens, but let us first scatter down for the chicks a liberal supply of rolled oats, the white flakes of which will instantly attract them, and they are left to themselves. In the evening, as we fix the fire preparatory to locking up for the night, we look at them and are pleased to find them scattered all over the hover bottom, and their contented little "peep" is the last sound to fill our ears as we go out, and our mind is already filled with visions of juicy broilers and big breasted roasters and the perquisites thereunto attached.

The next morning as we turn out at daylight to see our orphans we find them calling for breakfast. We touch up the fire and then a feed of rolled oats is given them with a dish of warmed skimmed milk. We use an old fruit can for this purpose with a notch cut in the edge. Partially filled with the milk and inverted into a saucer, this makes an elegant fountain for small chicks. A saucer not much larger than the can is best, then the chicks will not get "stuck up." The milk on the down will stick them together as bad as paste would. Some of the little fellows that would not eat will drink, so you save them along until they will eat.

That you will save more chicks by giving them warmed skimmed milk than by any system of feeding grain, is my way of thinking.

We next powder some charcoal in a dry bone or shell mill, and this is put into a dish and set in for the chicks to eat. We have found this an excellent regulator for very young chicks, as well as older birds.

We are now going to feed every two hours until our young charges are turned over to the butcher. Let it be done by the clock; you will then be more regular and can more easily even up the day.

For the first week you are limited to rolled oats, millet seed (which is a semi-green food) and cracked corn, run through a mill to make it fine enough, then sifted to save the meal, which, of course, is wasted by throwing it on the ground. We have kept our milk before them all the time, and have carefully washed the dishes twice a day, noon and night, as nothing gets any more filthy than do these dishes if left uncleaned, the fat of the milk, dirt and droppings all adding their mite to make it so, more especially as the chicks get older. Some think skimmed milk expensive to feed, but after trying it you will be convinced that the increased growth that comes from feeding it gives you a good profit on it, and this is what we should always think of when weighing the cost of food. The real question is, can I get enough quicker growth by using it and give me a profit on it? For feeding choice "fancy" chicks I have heard it contended that whole milk was cheap to feed. I have been able to buy all the skimmed milk I want for five cents a can, eight and one-half quarts to a can, and have used as high as twenty-six cans a day for broilers and roasters.

As we have put into each hover about one hundred chicks, we must see that the sand is carefully scraped off the top as often as necessary, probably twice the first week,

which will be increased each week until about the third, then we begin to clean them regularly every morning. We run the wheelbarrow into the walk and lift the hover, which is hinged against the partition so it is easy to get at. We take a small dust pan, or, if you prefer, make a scraper, by driving nails through a stick, something like a rake only closer together. Then scrape or rake the top off, going quickly from one to another.

For the first week we keep the board in the slides just forward of the hover, as stated before. Now the second week we will remove it and keep an eye on the chicks to see that they do not get lost or get chilled by staying away from the fire too long.

For this week we will feed about the same, only perhaps it will be well to try them on a little mash made up of one-third corn meal and two-thirds wheat bran, seasoned with salt and pepper, just the same as though we were to eat it ourselves. Mix well and add boiling water. Don't put in enough to make it sloppy. Allow it to stand a short time, then feed. Not much will be eaten, but they will get so before the end of the week they will look for it, as you feed your soft and hard grains alternately.

The third week we always settle down to our regular routine, to be continued until about ready to market. During the second week we have cracked some wheat in our mill, so have had that for an extra dish and a change, giving corn as a last feed generally. A good many feed cut or pinhead oat meal to little chicks. This we have found to be a trifle pasty or gummy, and have dropped it, as more will get stuck up around the vent when this is fed than when not.

There is one thing that is absolutely imperative—that is, to get your chicks out on the ground. If it is bright and warm put them out for a few minutes when a week old. Do not let them stand "humped" up and shiver, but make them hustle around, by driving or by feeding a handful of millet seed. After the second week they must go out every day unless it storms, no matter if it is zero weather. After you have tried it you will see how essential it is, for you can not keep them on their legs under such high feed in any other way.

Duties of the Third Week.

As we enter upon the duties of the third week we will now get our routine started and will see the chicks push along for the next five weeks, at which time we hope to see two-pound birds ready for the market, and get sight of the returns for our labor. The first thing in the morning is a feed of hard grain; then comes a feed of chopped raw potatoes. As the chopping knife and tray were too slow, we got a mince meat chopper, had a new disc made with larger holes, about three-eighths of an inch in diameter, and ran the potatoes through that, catching in a pan the first and last to come out as it is nothing but water. The other is the pulp. Now take their feed dish and give each pen all they will eat. A little later we throw in a little cabbage, cut in strips, which they will seize and chase each other around for until it is all eaten.

This constitutes all the green food they have, except once in a while we may substitute onions in place of cabbage. We have gotten our mash made for the day, and as 9 o'clock has come we will feed our first feed of it for the day, only feeding what they will eat quickly. We feed on tin plates, about fourteen inches in diameter and a quarter of an inch deep with a wide fold at the top. These can be readily cleaned preparatory to another feed by scraping with the feeding shovel, which is a small shovel about four inches across, made of heavy sheet iron and a white iron handle. We have a pan to put the leavings in, if any. They go into the swill for the pigs. At 11 o'clock another mash, then the dishes are picked up, taken into the kitchen or cook room and washed.

Again at 1 and 3 o'clock we feed the mash and if we have used good judgment we have had a hungry mob each feeding. If we have been liberal, we find they have left something each time and are not ready for their feed. When this is so just scant them until they clean up each time and do it quickly, taking care you have enough for all. You will find the number of plates will have to be increased, as the chicks increase in size, in order that each may have a chance. At 5 o'clock or before dark throw down a liberal feed of cracked corn.

We follow this bill of fare for about four weeks. As we have crowded the chicks pretty well, by putting one hundred in a pen we must take extra precautions against filth. At about four weeks of age a day's droppings is considerable on the floor of the pen so the floor is now raked over each day and the collections wheeled out. For this we must use a loop toothed rake.

We have by this time found our fountains small and easily tipped over by the chicks, so we have adopted new ones holding nearly two quarts, made of galvanized iron and cone shaped on top, to keep the youngsters from roosting on them, and instead of the saucer we use a small deep agate pan, only a trifle larger than the fount. This we find to be very satisfactory as the chicks can not put their feet in it.

Chicks now Six to Eight Weeks Old.

To come back to the six to eight weeks old chicks. We must now think of finishing them off. We examine them, weigh a few, calculate how much flesh can be made on them in about ten days, for as broilers Boston has no use for anything over four pounds to a pair. We have fed so much bran that as we lay back the feathers on the breast we say, "They ought to have more color." How can we get it? We cast about for a way to get this. We know corn will do it, but we loose time if we drop off from soft feed to hard. The chicks won't grow as fast and we must turn them off as soon as possible to get the most profit from them. So we put into the mash all the cotton seed meal we can stir in and not make it "salvy" or "puddingy," as we call it. With a little treacle added we have accomplished the result.

We now have a fine yellow skin if we have not foolishly chosen a blue blooded carcass, but any yellow-legged variety will respond to the treatment. I would caution you against trying to feed this for too long a time, say more than two weeks, as the chicks will get cloyed by it, and you cannot hold their flesh, to say nothing of making any unless you keep their appetites "up to the clip." This being such a high feed, it seems to become nauseous to them. One would find it difficult to keep them on their legs if it were fed from the first.

We have now "forced" the birds for eight weeks and have obtained what we set out for, viz: Two-pound broilers at eight weeks.

This has been successfully accomplished on our farm with White Wyandottes. We have not done quite as well with any other variety. As I stated in my last paper, they will stand on their legs where Plymouth Rocks would be rolling on their sides with the same feed.

We put up two pens of 110 each, and at eight weeks they weighed two pounds each, and a portion two and one-quarter pounds each under this system of feeding and almost the same treatment. By continuing the regular feed we have made five and five-eighths-pound roasters at fifteen weeks old.

One thing more before closing: If you ship your poultry to market alive, and it travels twenty to thirty miles on the railroad, feed the night before, not too heavy but some,

as the birds will empty themselves in the night and on the journey. Give them all the water they will drink before they start on their funeral ride. You will thus save a portion of your shrinkage to nobody's injury, but to their gain, I believe, as you help retain the juiciness of the flesh.

Some of these hints have been gained in the expensive school of experience, but if any earnest, honest poultryman can get anything of assistance from them he is welcome. As one word of caution, do not attempt to raise your breeding females under such hot-house methods, because you will sacrifice your size through early maturity, as after a period of forcing as given above it is no uncommon thing for pullets to lay at sixteen weeks, and we all know that is enough to stop growth. You may start your breeders in the brooder, holding off forcing foods, but get them out as quickly as possible.

The summing up of the discussion is, breed, feed and care. Let us not disdain to use the breed because it may be bred to "fancy points," as the fancy has given us our best and most practical varieties, and the nearer a typical bird we have, of almost any breed, the better carcass we have.

CARE OF BROODER CHICKS.

The Brooder Chick from Egg to Maturity—Ventilation, Moisture, Temperature and Floor Space Discussed by Breeders who Know the Requirements of Brooder Chicks—Brooding Houses and Coops—Foods and Feeding—General Advice on Management.

[This symposium (the third on the Care of Young Fowls) is devoted to brooder chicks exclusively. To hatch chicks in an incubator is comparatively easy, and may be done by a novice, but to raise the chicks after they are removed to the brooder requires a knowledge which does not stop at a thorough understanding of brooder operation. The movements and appearance of the chicks inform an experienced observer what is necessary for their well-being. To obtain the greatest growth in the shortest time, chicks must be healthy, comfortable and always on the jump for food. Improper conditions result in death. It is from men who are competent to raise brooder chicks with the lowest possible mortality that we have obtained the following useful information for our readers.—Editor.]

Advantages of Brooder Raised Chicks—Rations and Care.

One of the most necessary appliances connected with the poultry industry is an A No. 1 brooder, even though a hatcher is not in use. It is an easy matter to find a number of sitting hens, and by placing in the brooder the chicks hatched by them, you avoid feeding the chick's food to the hens, and they will soon begin laying. The chicks can be cared for and reared safely, no matter what weather prevails outside the brooder. They are free from vermin and if the brooder is kept clean they will not be troubled with lice. There is no need of losing a chick if properly cared for. They will be much more tame and more easily handled than those reared by hens.

For from fifty to seventy-five chicks a run of twenty feet is sufficient for one to two weeks, after which the chicks should be placed in a larger inclosure or allowed to run at large. I believe in plenty of range, as chicks confined to small inclosures very seldom develop well, but often do develop off colored feathers in plumage, which nature provides against if they have large range. The run may be made of boards twelve inches high, a portion of which may be covered with cheese-cloth. This will afford protection from wind and storms, also from the sun.

Chicks when first out of the shell can have no better food than bread for two or three days, then a mixture of cornmeal and bran (half and half in bulk), to which add a small quantity of bone meal, about one part to eight of the mixture of meal and bran. Wet this with water and it makes an excellent food for morning and noon. At night good, clean wheat and cracked corn, with oat flakes or hulled oats is unsurpassed. Milk is very beneficial if placed where fowls or chicks can drink it, but should not be mixed with the food.

A good brooder, an abundance of the right kind of food, coupled with a fair amount of common sense, will bring good results. W. F. BRACE, New York.

Lessons from Nature—Interesting Experiences—Limit the Food Supply.

While we have most of our chicks raised with hens on farms we still raise some in brooders. We allow the chicks to remain in the incubator from ten to twelve hours after they are all hatched; then we put them into a warmed brooder with the floor covered two inches thick with wheat bran. After they have been in the brooder two days we scatter a little millet seed in the bran, but not much for a week. This season we have used "Fidelity Chick Feed" alternately with millet and have had success. When a few weeks old we feed cracked corn and whole wheat, in fact anything the chicks will eat, as great a variety as possible, and not too much at a time, keeping them in good appetite all the time, so they will take plenty of exercise. It is well to have plenty of chaff or cut straw, hayseed or anything of that kind to scatter their green food in to make them work, not forgetting grit and green food.

Use only a brooder so constructed that the chicks can get any degree of heat they want, and one that allows the chicks to get away as far from the heat as they want to, and they will take care of themselves.

One thing in raising brooder chicks seems to us to be of more importance than anything else, and that is the feeding of the chick the first week of its existence. When a chick is hatched nature has supplied it with enough food so it can easily do without eating or drinking for a week or over. We will give one instance that will prove this without a doubt.

A few years ago we had a hen that would fly through a ventilator and get above a board ceiling in one of our chicken houses; there she laid a lot of eggs and hatched a dozen of chicks. Judging from the looks of the chicks when we first found them they were about ten days old, and during that time they had neither food nor water. A stronger lot of chicks I never saw and they were as wild as a deer.

In 1890 we took two hens with fifteen chicks each and put them into a cornfield a quarter of a mile from our buildings and left them to hunt their living as best they could. The chicks had no water or food, except what the hen found for them. After they were ten days old we went to see them and note results. We found the hens had not been ten yards from the place we put them, and such a sleek, healthy and vigorous lot of chicks we never saw. Being satisfied with results so far, we left them another week, but when we went to see them we only found a few feathers from the hens, as a pack of dogs had put a stop to our experiments, but we

learned this one fact, that very little, if any food should be given to newly hatched chicks for the first three or four days at least, and we believe there are more chicks killed by overfeeding in the first ten days of their lives than at any other time. This hardly ever affects the chicks until about the seventh day, when they get diarrhœa and stand around with full crops and soon die from indigestion, caused by strong food and feeding. We all know what a hen that steals her nest does after her chicks are hatched. She does nothing the first few days but brood her chicks, then after they are three or four days old she will commence to scratch for them, but very little do they get for the first ten days. They secure a few small seeds at a time, and as they grow, and their digestive organs get strength they find more food, and most of the chicks live and grow to maturity; they develop very fast, too. Let us watch the old hen and learn lessons that will help us much in raising chicks with brooders.

We think exercise is of great importance, and if one is so situated as to allow the chicks a good run it will be found very beneficial. If the room is limited use plenty of litter with dry feed scattered through it. Avoid sloppy food. Remember dry food is nature's food, and always remember, too, that little food is far better than too much.

AUG. D. ARNOLD, Pennsylvania.

On Brooders and Breeding.

Four years of experience with artificial incubating and brooding has settled definitely in my mind the fact that with it we can raise "better poultry and more of it." I mean by this, that we can not only raise a larger quantity, but a better quality. This is from the standpoint of a fancier as well as a marketman.

In my hands brooder raised chicks are superior in growth and development, shape and plumage to those raised by hens. There are many reasons why this should be so, and these will be apparent to the unprejudiced poultrymen. My exhibition specimens have invariably been brooder raised.

If I could have but one I would prefer a brooder to an incubator. I do not think an incubator superior to a hen for hatching, but I do think a brooder superior to her for raising chicks. To be successful the floor of the brooder should be built as near the ground as possible, should be capable of generating sufficient heat, and should have a regulator that will maintain the correct temperature. I believe a regulator on a brooder in which you expect to place newly hatched chicks is as important as that on an incubator. The heat should come from above, with just sufficient bottom heat to keep the floor dry. The temperature under the hover should be ninety degrees Fahrenheit for the first two weeks, with a gradual lowering from that on. Overheating is just as injurious and will cause bowel trouble just as quickly as with a chilly atmosphere.

Let me caution readers against buying cheap brooders, for they prove very expensive in the end. Out of the many brooders made and advertised, there should be no trouble to select a good one. Buy the best or none at all.

I have absolutely no use for an outdoor brooder, unless it is to be used indoors, and then I prefer an indoor brooder. Imagine shutting up fifty to two hundred chicks in a brooder three by four feet for two whole days when the weather is stormy, and expecting them to do well.

I have made small houses, six by eight feet, with a window and door in front. In a corner of this house I place the brooder, and after the chicks are three days old I give them the run of the house. On pleasant days the door to this house is left open and the chicks are given the run of the yard. In stormy weather they are kept in the house. On the floor of this house is four to six inches of chaff and into this the food is placed. At the end of eight or ten weeks the brooders are removed and roosts are put in their place. The young are left here until placed in winter quarters.

For food for the first four weeks I use bread soaked in milk, squeezed dry as possible, millet seed, cracked wheat, and oat groats. After the fourth week cut green bone is fed twice a week in place of bread and milk, and cracked corn alone for night food. Chick grit, granulated bone and dry bran is kept before them at all times. Be careful and not overfeed. Small chicks will commence to scratch as soon as hungry, and they should be kept at it.

It is needless to say attention to details is necessary to success. Clean the brooder frequently and keep the surroundings in a sanitary condition.

Fresh, pure water should be kept before them. Get the chicks out on the ground as soon as possible if but for a few minutes every day.

With me the brooder chicks and their care is a source of pleasure, and their attention means a friendship between us which is noticeable when they become adult fowls.

DR. O. P. BENNETT, Illinois.

The Temperature of the Brooder is of First Importance.

We have been raising chicks since 1893 and with the exception of the first year we have raised nearly all of them in brooders. We have at times raised nearly every chick put into them, and again, we have lost every solitary one, with many varied and interesting experiences between the two extremes, but the method with which we have had the best success is that which we here describe.

When the chicks are hatched we have the brooders all ready and warmed to a temperature of ninety degrees, which we consider nearly a perfect temperature (that is ninety degrees in the coolest part of the hover and not exceeding one hundred degrees in the warmest. We place the chicks under the hover and for one week keep the temperature at, or as near ninety degrees as it is possible to keep it. The second week, if all has gone well, we reduce the temperature to eighty degrees, and after the second week and for as long as the chicks need the heat in a brooder we run it at seventy to eighty degrees, or at whatever temperature the chicks seem to be contented. We consider the heating part of this brooder business of more importance than the method of feeding, as too much or too little heat will wipe out a whole brooderful of chicks before one is aware anything has gone wrong. Another thing—in the night when there is a change in the weather from one extreme to the other, one will, many a time, save a bunch of chicks by going out and changing the lamp flame, either up or down, as may be necessary. No matter if you are sleepy, if you wish to raise the greatest number of chicks, you must attend to this duty.

As to feeding, we have wheat, oats and corn, equal parts of each ground together, and, with one-third its bulk in bran mixed with water to a stiff mass, a little soda added, and sometimes two or three eggs to a gallon of the food. This we put in a deep pan and bake thoroughly for two hours in a good hot oven. We use this food crumbled fine with a little more dry bran added for the first four days and feed three times a day just what they will eat up clean. At noon, after the fifth day, we feed a little wheat, cracked corn and millet seed until they can eat cracked wheat, oats and corn, when we feed equal parts of wheat and oats, but only half as much corn. After the first week we add a small quantity of green cut bone every week day in the evening food. When they are five weeks old we feed whole grain

morning and noon and soft food (not cooked) and green bone at night, until they are nearly matured, when we omit the noon feed entirely.

We keep them in their regular brooders until they can do without the heat; then they are changed to a cold brooder for a week or ten days, and from there to our open front roosting coops. They remain in these coops until they become troublesome to the smaller ones, when we put the first hatched lot in our large pens, separating the males and females.

Roosting Coop and Six Weeks Old Chicks.

We give our young chicks unlimited range of an old orchard, except during the first two weeks, when we use a small pen ten feet square around each brooder for fifty chicks. We never put more than that number in one brooder.

For our early chicks, for green food, we use a small amount of clover meal in their food. Young chicks should be placed on the ground just as early as possible after the second or third day. The little chicks in cool weather should be placed in a sunny spot and in extremely hot weather kept in the shade.

CLARK & TROLL, Ohio.

Keep the Brooder Clean—What to Feed—Hens Bring Lice.

Yes, I have had some experience raising chicks with brooders. As to the number of chicks to a brooder, I have yet to find one that would accommodate more than thirty or forty chicks for me. There is much danger of over-crowding where more than forty are placed in the same brooder.

Special care is needed to keep the chicks very clean, and the fresher and cleaner the surroundings of the chicks the less liable one is to lose them.

In regard to feeding—I like pin-head oatmeal or rolled oats for the first four or five weeks, with a change to bread and milk or Spratt's patent chick food. An excellent change also and one that produces growth is fine cut green bone. As to the quantity, I give them what they will eat up clean. I would much rather keep them a little hungry than have them stuffed with food.

I feed about five times a day the first week; after that four times a day till they are nearly full grown. Cracked corn, wheat, buckwheat, ground oats and green cut bone is what I give them from six weeks old upwards. I keep plenty of grit before them, also plenty of fresh water in clean fountains or dishes.

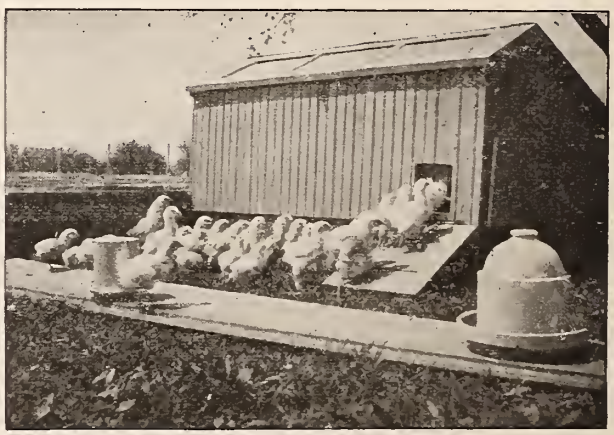
When weather permits I allow them to run at will, giving them practically free range. I have five acres devoted exclusively to White Wyandottes and raise about two hundred chicks on the home place. I farm out extra ones on different farms. I find that they do much better in small numbers. It is not how many I try to raise, but how many good ones. I enclose films, from which to produce photos. Select any that will help you to explain. Take notice that some are of hens and their broods, I raise some by natural way, but have to be on the alert for fear of lice. Some films will show chicks when six or seven weeks old, feeding in front of their roosting coops, which are used after weaning time. C. S. WETMORE, New York.

Five Dollars an Hour Earned by Raising 400 Brooder Chicks.

Your request of June 13th was duly received and found us with some twenty thousand ducklings on hand and two hundred tons of hay ready for the knife. This work supplemented with strawberries and weeds, leaves us, as you well know, but little time for literary work of any kind, but will try to contribute my mite to the general fund.

I had a little experience a few years ago which I think will illustrate the possibilities of chicken growing on a limited area and may interest and benefit some of your readers.

During the latter part of March I got out a hatch of Light Brahma chicks, four hundred and one in number. I kept them in the brooder house for a few days, then, being short of room, put them outside in two outdoor brooders, inclosing them in a little space of six square rods, inside a wire fence one foot high. I think I have never suffered so small a mortality in all my experience with chicks, losing but three of the whole number and one of those killed by a dog. Those chicks commenced growing from the first and in three weeks' time began to hop over the wire. I hastily placed a four-foot wire around the pen intending to move them to different quarters when convenient, but they made such a remarkable growth and seemed so healthy, I thought I would see how long they could be kept growing in that



Brooder Chicks and Brooder.

limited space. I attended them myself. The yard was swept every day with scrupulous care and the excrements removed. The birds were fed systematically and always kept a little hungry. They never left that yard till they went to market, then weighing from five to six pounds each, dressed, and there was not a cull in the lot. Their plumage was glossy and fine. The birds were gentle and could be taken up at will.

When a little over four months old and about ready for market, I notified Mr. Hunter, then of Farm Poultry, that I had a show for him. He came out the next day and when

he saw those chicks he would not believe that they had been grown in that yard, as there appeared to be but little more than standing room for them. He asked my men if I was not hoaxing with him, and he finally acknowledged that they were the finest lot of chicks he ever saw together.

They were fed four times per day till a month old, after that three times. They were started in with bread crumbs and hard boiled eggs chopped fine. One part egg to five parts crumbs and plenty of grit mixed in. After three days their food was equal quantities of wheat bran and cornmeal with a little fine beef scraps, and I gave them one feed each day of rolled oats and cracked corn. As they grew older they had a bucket of clotted milk each day, boiled potatoes and green grass. Toward the last, one feed of whole corn and over one-half a bushel of finely cut cornfodder per day. In fact nothing came amiss; they greedily devoured everything I gave them and appeared to have every confidence in my judgment. They brought thirty cents per pound in Boston market, aggregating nearly six hundred dollars, thus paying me for all food consumed and nearly five dollars an hour for all time in caring for them and had they been hatched two weeks earlier they would have brought thirty-five cents per pound. With one exception, this was my most successful experience with chickens.

JAMES RANKIN, Massachusetts.

Raising Chicks in Brooders.

We use both indoor piped sectional and outdoor hot-air brooders. To begin with, our chicks are well hatched and come out strong, plump and active. Very early in the season, when the weather is still cold and frosty and no grass growing, we use the indoor brooders. These machines are set up, thoroughly warmed and tested before the chicks are put in. The brooder floors are sanded and the house floor covered with chaff or cut straw. During the first few weeks we keep the hovers very warm and if the chicks are too warm they crawl out where it is cooler. At night in particular we are careful to have a good surplus of heat, so that the chicks lie partly outside the hovers, as from midnight to morning the temperature of the room will lower considerably, so the chicks will go under the hover and be very comfortable. Were it not for this surplus of heat when left at night the chicks might be chilled before morning and then bowel trouble would make its appearance and many chicks die. Each room is sixteen by twenty feet and not unusually over four hundred chicks to each brooder.

The first few days the chicks are fed granulated oatmeal only, with clean water (not too cold) for drink, and some good, sharp grit before them constantly. The first week we feed four times daily and but little at a meal. We then begin gradually working them on to a diet of cake, varied with cracked wheat. The cake is made of ground oats (hulls sifted out), cornmeal and best coarse wheat bran, about equal parts by bulk, with a very little high grade beef scraps mixed in while dry. The mixture is then moistened with some milk or buttermilk salted as for the table, leavened with soda, and baked.

The baking tins should not be quite full, as when the bread is done we turn it upside down on a board so the crust will be softened by the steam. As the chicks grow older the amount of beef scraps is gradually increased. This feeding goes on until the chicks are five to six weeks old, when a warm mash of about the same material as the cake is fed once a day, and whole wheat and cracked corn twice. This mash is moistened with warm water with a little salt dissolved.

Just as soon as we can get fresh clover or grass it is fed daily, cut in one-eighth-inch lengths. Chard, lettuce, beet tops or any such green stuff is also good. The hard grains are fed in the litter to induce exercise after the chicks are older and strong enough to work it out.

When the chicks are ten days to two weeks old and the weather is suitable they are let out in yards about fifty by two hundred feet in size, care being taken that they can find their way to the house when stormy. When they are about eight weeks old the yards are opened and the birds given free range.

When the chicks show a disposition to roost on top instead of inside the brooder, roosts are placed back of the brooder and the chicks encouraged to occupy them, when in a short time the brooder can be removed.

Just as soon as grass starts in spring, we begin putting chicks in the outdoor brooders, and when they are four to six days old we let them out on the ground in small yards in front of the brooder. As soon as they get familiar with going in and out and learn to go inside when the weather is stormy we give larger yards, running entirely around the brooder, and finally when the chicks are three or four weeks old we allow them free range. These chicks are fed same as in the indoor brooders, except that cut grass is omitted, as they help themselves to the fresh, growing article, and the exercise they get in pulling it off and running around the yards is a wonderful aid to growth.

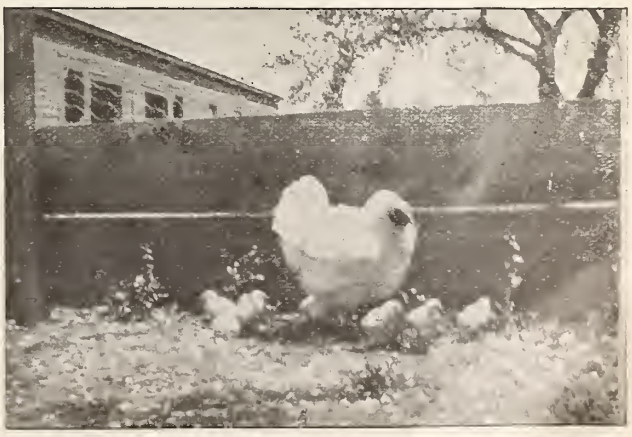
In my opinion an outdoor brooder should have a light, cool chamber attached, where the chicks can feed and exercise when very young, or when the weather is bad, and into which they can retreat in case the brood chamber should become overheated. Outdoor brooders have some advantages over those indoor, but they require more watchful care. Their greatest point of superiority is that the chicks can be got out on the ground at a much earlier age, and in running about their yard, picking the fresh grass, etc., get much healthful exercise. When the weather gets very hot the outdoor brooder should be placed in the shade, and a shady run provided for the chicks when very young, as the intense heat of the sun kills a great many. When running at large the chicks will seek shade of their own accord.

We like both kinds of brooders, use both, and would not wish to be deprived of either.

H. J. BLANCHARD, New York.

The Brooder Chick from Egg to Maturity.

Early in our experience of artificial brooding we became convinced of the fact that the foundation of successful brooding was laid months before the chick was hatched.



The Old Way.

By this we mean that unless the breeding stock is in the best of physical health we cannot hope for the best results

in raising our young stock. Too many of the reasons assigned for the large mortality among chicks are, to say the least, of very uncertain signification, and not enough attention is paid to the poor condition of the breeding stock, which is to our way of thinking, the main reason why a larger percentage of chicks do not reach maturity.

Our first attempt at brooding chickens artificially resulted in disastrous failure, but by close observation and many costly experiments, we finally adopted a method which is giving us gratifying results, and we feel sure that those who will try it will be pleased with it.

It goes without saying that the eggs must be well incubated, and every attention given them while under process of incubation. We leave the chicks in the incubator forty-eight hours after they come out of the shell. The morning of the third day we take them out of the incubator and carry them to the brooders, which have been previously warmed for their reception. We then give them their first feed, which consists of whole wheat bread, moistened with milk. We never place more than fifty chicks in each brooder, sometimes only forty. The temperature of the brooders is regulated by the disposition of the chicks on the brooder floor; if well spread out, we know they have sufficient heat, if all crowded in a corner we know they need more heat. That is our thermometer, and a reliable one.

An Interesting Study.

We wish here to relate an experiment we made in order to determine the length of time chicks can be left in the incubator without food. Five chicks were left in the machine, the ventilators wide open, and the heat regulated to 100 degrees. At first it was our intention to leave them in until they showed signs of weakness, but on the fourth day our courage weakened, and we fed them. They had up to this time showed no other signs but that of being very hungry, running to the glass front of the machine upon hearing the least noise. We marked these chicks and let them run with the rest. At maturity two of the cockerels weighed eight and three-quarter pounds each; three of the pullets six pounds, six and one-quarter pounds, and six and one-half pounds respectively. All of them lived to maturity and were always bright. Since then we always left our chicks forty-eight hours without food and believe this to be the very best way to start chickens growing.

Our brooders are placed inside of a house eight by ten feet, with yards eight by twenty-five feet, each brooder occupying a separate house. The floor of the brooder is carpeted with cut clover, but the brooder house is filled in to above the sills with clean, sharp sand. The chicks are left in the brooder for two days, then let out into the house for three or four days, then the slide door to the yard is left open and they are given the run of their yards. When the chicks are six weeks old we take away the fence to the yards and give them the free run of the farm.

For the first ten days of their lives our chicks are fed only whole wheat bread moistened in milk every four hours. Water (warmed in cold weather) is always before them from the start, and is renewed twice or four times a day according to the weather. When the chicks are ten days old we still continue the wheat bread morning and night, the other two feeds are made up of the following mixed grains: Cracked wheat, 50 pounds; coarse oatmeal, 25 pounds; cracked corn, 10 pounds; millet seed, 5 pounds; fine meat scraps, 10 pounds. When fine meat scraps are not procurable, boil some liver, chop it up into fine pieces, and use that instead. Some heresy hunters will prick up their ears upon reading this and criticise us for giving meat to our young chicks, especially when given free range, but we know that it is impossible to grow the finest chicks without the free use of meat, but it must be used with judgment and be of good quality.

At six weeks old we make the mixture of whole grains instead of cracked, still feeding it twice a day, but at this age the bread is replaced by a mash fed morning and night, composed as follows: Wheat, 50 pounds; shelled oats, 25 pounds; pearled barley, 15 pounds; corn, 10 pounds. We buy the grains whole and have them ground up together into a meal. To every 100 pounds of this meal we add 10 pounds of the finest quality meat scraps. We continue to feed our chicks four times a day until three months old, then we drop one meal, and feed only three times a day, mixed grains in the morning and noon, and mash at night. We aim to feed all they will eat at each meal, without overfeeding. Now and again when they do not appear hungry we drop a meal, and they are benefited by it.

At three months old we separate the sexes, giving the cockerels one part of the farm, the pullets the other.

We have said nothing about charcoal, dry bran, tonics and condition powders, simply because they are unnecessary. Grit of course we use and find we cannot get along without it.

While we are painfully aware that our method is not perfect, we cannot overlook the fact that by following it as here described, we have succeeded in bringing to maturity over ninety per cent of all chicks put in the brooders. Our chicks grow steadily from the shell up, our pullets begin laying at six months old always. They have produced two hundred eggs in one year. A good deal of this large egg yield was due to the care given the pullets while growing and after they began to lay, but had they not been bred from layers we could not have reached these results. If only those who decry the practice of breeding layers by the individual record system would try it, they would soon become converts to it. However, the proof of the pudding is the eating of it; give our way a trial before you condemn it, you will be pleased with the results.

C. BRICAULT, Massachusetts.

Feed and Care Given Flocks of Brooder Chicks.

As our present plan of feeding is giving such good results we will here give you a description of the care and feed given our chicks. We leave the chicks in the machines until the morning of the twenty-second day, taking out the trays the night of the twenty-first day, thus giving the chicks more room and light.

The morning of the twenty-third day the chicks are taken out and put into out-door brooders and given a breakfast of dry rolled oats, which we feed for a week or ten days. A little chopped lettuce is much relished by the chicks also. From rolled oats we go to a mixed food consisting of the H. O. Co. poultry food with a little more rolled oats and meat

meal added to it. This we mix up with curdled milk until it will crumble in the hand. This we feed until it is time for whole grain and cracked corn, and we find it is giving grand results. We neglected to state at the beginning that first and foremost the chicks are given plenty of fresh water

Feeding Time.

as well as good food, all of which make chicks grow and keep them growing. Charcoal and fine grit are also among the necessities of proper feeding.

Great care should be taken to keep the brooders cleaned at least once a week, and aired every day.

Mr. Wyckoff has always used indoor brooders, but he always had a great deal of trouble in keeping the chicks warm early in the season and cool as the season advanced, and the result was the loss of chicks. There is one point in favor of indoor brooders, and that is in rainy weather the chicks have more room, but with the style of brooders we have now in use we have had no trouble on this score, as we only put seventy-five into each brooder, which is but half their capacity, thus giving the chicks plenty of room for different kinds of weather.

Attached to each brooder is a small wire run, where the chicks are let out for a week or ten days, until they get used to going in and out of the brooder, then the fence is removed and the chicks have free range every pleasant day until they are separated and put in the brooder house and taught to go onto the roost.

We think we have the best plan for young chick roosts we have seen. We use four saw-horses placed at even distances apart. On these we have eleven roosts, four inches wide by twenty feet long, placed about two inches apart. These are fastened to the end horses by boring holes through the slats and horses and putting spikes through both, thus holding them all in position. We find them easy to build, easy to clean and easy to take down and store. These eleven roosts will accommodate from three to four hundred half-grown chicks. Our brooder house is situated in a large pear orchard covering about eight acres; the soil is gravel and sand and is seeded to clover. We also have two living springs, so our stock get plenty of good pure water, lots of shade, ample range, with plenty of insects to keep them busy between meals.

GRAY & STORKE, New York.

Brooder Chicks and Growing Stock—Care and Food.

It is a delightfully easy thing to tell how to raise chickens. It is not quite so easy to successfully raise them. There is little need for any extended directions for raising chickens by the natural method other than in the points of food and cleanliness, with some little attention to the details of housing and shade. With artificial hatching the business takes on a development and calls for much greater care and decidedly more attention to food and management.

Little need be said of the hatching, except that the best incubators should be used; the second rate and cheaper machines being generally unworthy of confidence; that is, the problem of hatching is of sufficient importance that only the very best means to this end should be accepted.

In producing eggs for hatching the very best attention must be given to the breeding stock, and if good results are to be had the birds must be the product of several generations of hardy, vigorous stock.

The strongest emphasis may be placed upon the fact that it is much easier to hatch chickens than it is to raise them after they are hatched, and the first two weeks in the little bird's life is a crucial period, and under some conditions the second two weeks is harder to tide over than the first fortnight, yet with due care and proper attention to the warmth and food they may be and are successfully carried to an age after which death is generally the result of accident rather than ailment or disease.

What they shall be fed when taken from the machine at the expiration of twenty-four or thirty-six hours is a question which has exercised the mind of every producer of chickens. Every conceivable sort of food has been suggested, recommended and tried in more or less cases. We believe that the simpler the ration the better the chicken and the surer the success in its raising. All fancy mixtures and fussy feeding notions may safely be eliminated. The oldtime mixture of boiled eggs and cracker crumbs is now-a-days pretty generally neglected. In some instances breeders are using this mixture successfully, but in more cases they are killing their chickens apparently by its use. We have tried practically every system from the egg and crumb diet to that of dry food alone, including baked cakes, bread crumbs and various oat foods and so on, et cetera, et cetera, and have gradually simmered down to the point where we now feed exclusively for the first two days a mixture of two-thirds wheat bran and one-third Indian meal moistened with milk, and to this we add about five per cent of fine gravel or grit. The chickens are fed all they can eat, in fact it is before them practically all the time for the first forty-eight hours, and from then until a week or two of age there is very little of the time when food is not within reach. After the first two or three days they are fed in addition finely sifted cracked corn and rolled oats, chopped

How They Mature.

oats, cracked wheat or, in fact, any grain or food which they will eat. We conclude it makes very little difference so long as they have a fair proportion of animal food, which, with us, is in the form of ground beef scraps, and it may be just as well or better in the form of milk, either

sweet or sour, skimmed or whole. When milk is fed to very small chickens it is better to moisten their food with it than that they have it to drink. If they have it as a drink they are quite apt to smear themselves with it, making them sticky and dirty, and both ill-feeling and ill-looking. After the first three or four days the grit is left out of the food, a supply being kept constantly within reach, which they eat as they require it. The warmth in the hover is started at ninety-five degrees, with the chickens all in. From that it is gradually lowered, more attention being paid to the action of the chicken than to the temperature as registered by the mercury. When the chickens are comfortable and settle down contentedly without over-crowding or pushing too much to the outside, it is concluded that the conditions are right and they are doing well. When, on the other hand, they crowd and cry, not enough heat is supplied, and we give them more. It is impossible to give small chickens a satisfactory treatment where the brooders are run altogether by the thermometer, regardless of the outside weather conditions, and the indications of comfort, which may be observed from the chickens themselves. The brooder floors and pens should be scattered with chaff or covered with sand to induce action and exercise through scratching and working for particles of dry food, which may be thrown about in the litter. The one thing essential to the health of the chicken is abundant exercise. Without this they will not thrive, and success cannot be attained. In order to get the necessary exercise it is imperative that they have an abundant supply of fresh air and an outdoor run at all seasons of the year. A few minutes in the open air will do the smallest chicken good, and after they are a week or ten days old they may be trusted to run back and forth in pleasant weather almost regardless of how cold the outside temperature may be. Fussy coddling and over-heated compartments have been responsible for the death of more chickens than any other cause. Whenever trouble appears in a flock of chickens the first question with the average beginner, and sometimes with the more experienced person, is what their food has been. The attention and investigation is generally directed toward the food. The facts are that the strong, healthy chickens having abundant exercise and a good supply of fresh air will stand almost any sort of food without taking harm. The main thing is to get the exercise. It perhaps might be noted here that this is practically the secret of success in managing breeding stock as well as chickens.

Clean water should be always within reach of the chickens, and it should be kept in some such fountain as will make it impossible for the little birds to get into it. This will save frequent drenching and occasional deaths by drowning. In extremely cold weather it is better that newly hatched chickens should have luke-warm water than that it should be given to them icy cold. Many breeders do not give the little chickens any water until several days old, some even keeping them several weeks without it. We have not thought it the best way, and we give water from the first. From their very evident pleasure in drinking, it must taste good to them, and we doubt any possibility of harm from drinking over much clean, pure water.

There is a good deal of question what the limit is in the numbers that may be kept together safely. Many advocate fifty as the best limit, while others keep from one hundred to two hundred in the same pens and under the same hovers. There is little doubt that for the beginner, at least, flocks of fifty or sixty will do better, and there will be a lower death rate than in flocks of one hundred and upward. We have built our brooder building with the pens three by ten feet, which are designed to accommodate from fifty to seventy-five small chickens. They will easily hold fifty chickens until six weeks of age if the chickens have an outdoor run. They are then put in a pen four by ten feet and kept until well feathered out, when they are removed to colony houses of one description or another. Of course the early hatched and winter chickens must have heat practically throughout the winter.

Late birds do very well without artificial heat after the last of March, and may be safely colonized in suitable coops at a few weeks of age—almost every kind of coop is used for this purpose, and it really matters very little what the style of the structure be so long as it conserves the essential features, which are dryness and freedom from direct draught. For some years open front and bottomless roosting coops have been strongly advocated as being the best fitted for growing chickens colonized in groups of from thirty to fifty. Our experience has led us to do away altogether with open fronts and coops without bottoms. There is a constant trouble from colds caused either by driving rains or bunching up on the ground, thus drawing up the dampness, which ends in running nostrils, wheezing and general debility.

As the chickens grow older they are fed rather differently. They have their regular morning feed, with one at noon and another at night. Generally the morning and the night feed are of mashes composed of bran and meal of about equal parts, with from ten per cent to fifteen per cent of beef scraps added. Oyster shell and grit are always by them, and green food is supplied as abundantly as is convenient. Where the runs are large enough so that the green food is not eaten down, no other need be given, but in yards devoid of grass some substitute will have to be added to the grain rations. In addition to these regular feeds three times a day many of the most practical and successful poultrymen keep a box of cracked corn open to them, from which they may eat at pleasure. Many also keep a box of coarsely ground scrap, which is kept constantly filled and which may be had at all times.

As the chickens gain size and the cockerels mature they are separated from the pullets, leaving from twenty-five to thirty-five or forty pullets in a flock. The cockerels are removed to another yard and, if designed for market birds, are fed all the fattening food which they will take, and as fast as they are in fit condition they are sent to market. The earlier hatched pullets should not be fed quite so much meat or animal food as the later hatched ones, or they will begin laying too early and will moult out in the fall, thus jeopardizing the supply of winter eggs. It is possible by forced feeding of animal food to induce very early laying, and we this season, without extra heavy strain, have started our Wyandotte pullets to laying at four and one-half months, which is too early to get the best size on the birds or the best results in constant egg production. Too early maturity is as much to be avoided as too late, that is, the pullet which grows along freely and gets a suitable frame and size before beginning to lay will make the strongest and most vigorous breeding bird and will in the end prove the most profitable.

We feed very little whole corn, as the cracked corn gives them more exercise in scratching and feeding, and does not pack so closely together in the crop. Considerable shelled and whole oats are fed, together with some wheat; the wheat, however, is more sparingly fed on account of the extra cost. We are able to get the same growing value from wheat bran and beef scrap at a much less cost than we can get it from wheat, of which the best grades only should be fed. Smoked and damaged grains, such as are commonly on sale for poultry, are unfit for this purpose.

Very many fancy formulas are to be had for broiler

feeding as distinct from roasters. We believe there is really very little difference and that the chicken that is properly fed and is in the right condition will be good to kill for broilers without any extra preparation, and chickens which are good broilers will, if kept, mature into good roasters. One of the really necessary things to do is to get rid of about nine-tenths of all the accumulated wisdom which has been loaded on to the chicken business, in many cases until it has nearly swamped it, and to get back to a few very plain principles. These briefly stated would be, sufficient warmth, cleanliness, plain food, and plenty of it: this, together with a good range, will produce chickens at a satisfactory profit, if the breeding stock has been properly selected and bred.

One of the very necessary points is good shade, and it must be had in some way, either by trees, board or brush sheds or otherwise. We have killed two birds with one stone, or rather saved several birds with one idea by building a number of houses on posts, which leaves them elevated about twelve inches or fifteen inches from the ground. These coops are floored, which keeps the birds high and dry and free from dampness, and at the same time allows them sufficient shelter from the sun, together with the draught, which is generally found nearest the ground, and on rainy days they bunch together under the buildings and enjoy themselves much better than they would were they obliged to stay inside. A board runway leads from the chicken door to the ground, giving them convenient passage to and from the inside. Since we have adopted this method of keeping the chickens we have had very much less trouble from colds and greater thrift than by the former method of colonizing in open front coops without floors. These coops are built four by eight feet and are four and one-half feet high in front and three feet at back, giving a sharp pitch to the roof, which sheds the water readily. They are covered with tarred paper and have one sash, six lights, nine by twelve inches, and a door twenty-four inches wide, and full height of the building, which is fitted with a screen for use in hot weather. There is an opening at the highest point at each end, which allows the heat to escape. This is closed in cold weather. The birds may be carried in this building through the winter if necessary, and before the chickens are large enough in the spring to be placed in them they are used for breeding pens and are very convenient for this purpose. These buildings are, as are all other quarters, inhabited by chickens, thoroughly disinfected at frequent intervals, with a solution of carbolic acid and water. Care must be exercised that too much carbolic acid is not used immediately before the chickens are shut in for any length of time as too much acid is quite fatal to small chickens. Any high grade disinfectant would answer the same purpose, the idea being to keep the house free from disease germs and to help the sanitary conditions.

G. H. POLLARD, Massachusetts.

Brooder Chicks—Feed and Care.

I want to tell you of my mode of feeding and caring for chicks. After the chicks are hatched I leave them in the machine at least twenty-four hours before placing them in the brooder. This makes them strong and vigorous. As soon as they are placed in the brooder I give them sand or fine grit and water. I keep water by them all the time, good clean, fresh water.

My first feed is hard boiled eggs chopped up fine. After that I feed millet scattered among the chaff that is on the bottom of the brooder and run. I feed both millet and hard boiled eggs at intervals (just what they will clean up and work for) for the first week, after that I give them a feed of cooked rice (cooked dry) for a change, also cut oats and corn bread. As the chicks grow older I add whole wheat and also feed some mash with a little blood meal in it about twice a week. One of the great poin's in feeding and care of chicks is "common sense and judgment." Study your brood and you can see at a glance how much and what to feed to supply their wants.

I remember one season I tried not feeding any food or water for the first forty-eight hours, etc. Well, the result was I lost all the chicks. As brooders (the leading machines) are nearly all properly constructed it remains for the operator to do his or her part, which if done there will be no trouble. I rear and have raised by farmers from 1,500 to 2,000 White Plymouth rocks every year, and must say if the farmers follow the above method of care and feed we loose but few chicks. I have pullets laying now and cockerels like old birds. It may be this is all due to their being White Plymouth Rocks, but I think the mode of care and feed has something to do with it.

U. R. FISHEL, Indiana.

The Value of Exercise, Limited Food, and Even Temperature.

Our experience with brooders has been somewhat varied, and not at all "clear sailing" by any means. We had some very disheartening times while we were getting our "experience."

The poultry Journals are full of advice regarding the operating of brooders. These methods sometimes seem directly opposed, and still, no doubt, they are the truthful experience of the writers. We believe that the greater number of failures with brooder chicks are caused by too mueh heat and overfeeding. We do not believe that brooders can be run successfully, generally, in cold weather without the use of thermometers. Chicks taken directly from the incubators and placed in the brooders will stand a far greater amount of heat than is good for them. Consequently if we judge altogether by their actions we may keep them at a much higher temperature than is good for them. This is reasonable, for we can so accustom a child to a high temperature that it will be uncomfortable in a room under ninety degrees, and none will deny that this amount of heat is injurious to the child. Ninety degrees three inches from the floor in the hover of the brooder is about right for the first week. This should be reduced gradually to eighty-five degrees the second week and to eighty by the end of the third week.

We have killed a whole lot of chicks, both in brooders and with hens, with kindness, i. e., with too much food. Now, we never feed oftener than three times a day from the very start, either with brooders or hens. This way works well with us and we shall stick to it. The danger of overfeeding with brooder chicks is especially great, as they do not and cannot take as much exercise as those with hens. Don't worry if they get hungry enough between meals to scratch good and hard. This is the making of them. It will help digest their food and ward off diarrhœa, which is only the result of indigestion.

All brooders should have an open runway or yard, and the chicks should be accustomed to running in this for at least a short time from the very start. Give fresh water to drink from the first. Keep fine grit in the brooders all the time. Keep the temperature right; have them take plenty of exercise; feed only three times a day, and "what you feed" will not be so important.

We are very partial to millet seed. In fact we have said that we could raise chicks on this alone, with water and grit. Equal parts of corn meal, bran, shorts and clover meal, baked with soda or baking powder, makes a good winter

feed. Stale bred, soaked soft and squeezed dry, is an excellent food for starting chicks. Put chaff in the yards or runs and sprinkle just a little millet seed in it and watch them scratch for it. This is our way, no theory, all practice. If your way is different, and you are successful, stick to it.

W. B. GIBSON, & SON, Pennsylvania.

Feeding the Brooder Chicks.

I have used several kinds of brooders. I first began with outdoor brooders with bottom heat, but had little success, but that was about twelve years ago, before brooders were as well perfected as at the present time. For a while after that I hatched with incubators and brooded with hens and since have used top heat indoor brooders with success.

The brooder with which I have had the greatest success is one having a hot water pipe system, and with this I can raise a larger per cent of the chicks hatched than with hens, and the same number with much less trouble and expense.

I feed chicks after they are about thirty-six hours old, once every two hours through the day till about four weeks old. No one need fear that any food is too fattening for young chicks. They need carbonaceous or fattening food to keep them warm while they are small and to sustain their vigor during the period of rapid growth. There is no one food which is as good as cornmeal, either in mush or bread, but I think a variety of foods is better than any one alone. A very excellent food for chickens is bread made from two parts cornmeal and one part wheat middlings, with two tablespoonfuls of animal meal added to each quart of the mixture; this stirred to a stiff batter with sour milk, in which enough soda has been dissolved to make it light, and baked in thin cakes to be fed warm or cold. This bread may form the main food till the chicks are large enough to eat cracked corn, broken rice and small grain and the bread may be supplemented by hard boiled eggs chopped fine. and other palatable foods. I save the infertile eggs from the incubators to boil for the chicks. After they can eat small grain foods I feed a mash once daily of the same meal mixture as described for bread, and a variety of grain foods, such as steamed rolled oats, wheat and cracked corn, plenty of oyster shells and grit, and clean fresh water, give access to a good grassy run, and a clean brooder. In short, to get the best results, chicks should be kept steadily growing from the time they leave the shell till they are fully matured. As they grow older they require proportionately more of the bone and muscle forming food and less of the more fattening materials.

The best way to care for the brooder is to clean it every morning and put clean sand on the floor to absorb moisture and to ease the chicken's tender feet from the hard floor.

GEORGE H. NORTHUP, New York.

Care of Brooder Chicks—Colony Coops and New Ground.

After many years with Buff Cochins we have almost adopted and believe the saying that, "If you hatch ten Cochin chicks and a board does not fall on them, you are almost sure to raise the whole ten." A good brooder, proper food, pure water, plenty of shade and green grass, freedom from lice, and the proper attention, will make Cochin raising the simplest thing in the world.

Our chicks are hatched both by hens and incubators, and we find absolutely no difference in the chicks, with the exception that those hatched by incubators are free from lice.

It is almost impossible to raise to maturity chicks from unhealthy and improperly cared for parents. It is equally impossible to raise chicks that have been improperly incubated, whether by hens or incubators.

It is just as probable that you will get improperly incubated chicks from hens as from incubators; for how often do you see a poor, run-down, emaciated hen bring into existence a flock of chicks when she is so weak, poor, and run-down that she is barely able to stand. This is not the fault of the hen, but of the failure of the proper attention having been given her. One can readily understand how impossible it would be to start and develop into active and vigorous life chicks that have been brought into the world under such unfavorable circumstances. Therefore, our first aim is to get our chicks from healthy, well cared for parents, and then to have them hatched under the most favorable conditions.

When the chicks are hatched we leave them under the hen or in the incubator at least twenty-four hours. If they are taken out sooner than this, they are not so strong, and the chance of raising them is much lessened. They are then given a thorough dusting of persian insect powder. This is very important, as they cannot thrive when lice are present.

We raise our chicks in outdoor brooders, using two hundred chick size, and put from forty to fifty chicks in each brooder. The brooder is gotten clean and is heated to ninety degrees the day the chicks are due to hatch, so that everything is in readiness for them. They are given plenty of water at once, and their first food consists of fine dry rolled oats. During the first ten days they are fed exclusively on rolled oats and millet seed. They are fed six times a day, alternating with rolled oats and millet. On the tenth day they are given in addition to the rolled oats and millet, well baked corn cakes, chopped fine. If they become droopy we add to and mix thoroughly with the corn cakes some finely ground Mica Crystal grit. This is the only medicine little chicks need. It is surprising to note how quickly they brighten up on this treatment. When three weeks old we gradually add to their rations cracked wheat and finely cracked corn, cutting out the rolled oats. We continue to feed the millet and corn cakes in conjunction with the cracked corn and cracked wheat until they are six weeks old. We then cut out the millet and corn cakes and substitute hulled oats and American poultry food. The American poultry food is given at noon, and to this is added twice a week fresh ground green bone.

We believe in feeding frequently and in small quantities at a time, as overfeeding is sure to make chicks dull and stupid and eventually bring on indigestion and inflammation of the crop. In giving the different rations we alternate and change as much as possible in order to keep them from tiring of any one ration. We give them fresh water twice a day, being very careful to keep the same in the shade. As we use outdoor brooders we are able to have them constantly on the move and thereby give the chicks pure fresh earth and grass.

It is very important to provide plenty of shade in summer. It is equally important to place the brooder for one hour each day, while open, where it will be subjected to the direct rays of sunlight, as this method and cleanliness are the only means of preventing the origin and spreading of tuberculosis, which is sure to occur in a close, crowded brooder, especially if dark and damp.

When the chicks are first put into the brooder they are confined for from one to three days, the length of time depending on the state of the weather. The brooders being placed on a nice green grass plot, we then provide for each brooder, one hundred yards of wire netting, one foot wide, with one inch mesh. When the chicks are first liberated from the brooder we drive stakes into the ground and make a coil enclosing about three square feet of space. As the chicks become more active, and readily cover this space, it is gradually enlarged from week to week, until the whole

hundred yards are in use. This method has saved us lots of worry and trouble, for when the chicks are young and are first liberated, if given too much space they are almost certain to stay away from the brooder, and it is very difficult to teach them to return to it. Then, again, brooder raised chicks have no mother to look after them and in case of a storm they can be very readily found and driven to a place of shelter. We have found that it is not so much the size of the run that makes healthy chicks, but it is the frequency with which they are changed from old to new quarters.

When they weigh about one and a half pounds or are nicely feathered, we divide them into lots of twelve each, being careful to have each lot the same size and development. These are placed in colonies, each colony being all cockerels or all pullets. Each colony is provided with a coop four by five feet, three feet high in front and two feet in the rear. These coops are provided with a storm door, and also with another door covered with fine mesh screen. This latter door is used on warm nights, and protects the chicks from vermin, etc., and the outer door, which is hinged at the top, is lowered about one-third, which protects the chicks in case of storms during the night. The bottoms of these coops are covered with a thick bed of straw. This is to prevent the breast bones of the chicks from becoming crooked, which is very prone to occur with Cochins. We never provide them with roosts until they are one year old.

When they are eight months old they are provided with more commodious quarters, and those showing promise of becoming choice exhibition specimens are cooped either in pairs or singly with the object of preserving their massive foot and leg feathering. A. W. RUDY & SON.

Limit the Number of Chicks in Brooders.

The most successful way that I have found to raise chicks in brooders is the following: Build a brooder house for each brooder, say about six by eight feet, with a door and a window to the south. Have these brooder houses scattered about the orchard, about one hundred feet or more apart, each house to be furnished with a one hundred-chick brooder. In this put from fifty to seventy-five chicks. It is not advisable to put more than seventy-five chicks in any brooder, fifty would be better, as I find that I usually can raise more of the chicks when I only put fifty chicks in a brooder than when I put in seventy-five or one hundred, besides you will have stronger and healthier chicks at maturity. I have no yards for the chicks, but give them free range. I do not let them run out until about a week old, after which I let them run out on all fine days, but always keep them in until the dew is off the grass, at least until they are well feathered. If this is done you will not have much trouble with gapes. Begin feeding when chicks are about twenty-four hours old. For the first few feeds I find nothing better than bread crumbs. Feed the first week about four times a day with bread crumbs and oatmeal. After the first week, when I let them run out, I feed three times a day, soft food in the morning and either oatmeal, cracked wheat, cracked corn or millet at noon and evening. Change about from one kind to the other and then the chicks will always have an appetite. When chicks are four or five weeks old I feed only twice a day. Feed whole wheat and corn just as soon as they can eat it. Always have plenty of grit standing around for them, and give them fresh drinking water. Keep the brooders and brooder houses clean and look for mites each time you clean brooders. Saturate the sides and bottom of the brooders with coal oil once in two weeks, and then the mites will not trouble you.

The foregoing is for chicks raised on a farm where there is plenty of range. I also find that farm raised chicks, as a rule, make stronger and healthier chicks at maturity and ought to be sold at better prices than those raised on small city or town lots, but they seldom are. You find that city breeders always ask double the price for their inferior stock, although it is no better than that raised on the farm. The best chickens for either the show room or for business are those that are raised on the farm which have unlimited range. EMANUEL SCHIEBER, Ohio.

Brooding and Feeding Chicks.

In raising chicks in brooders the first thing to be considered is the brooder. A brooder should be used that will give the chicks plenty of warm fresh air. Some people have the erroneous idea that air must be cold in order to be fresh, which of course is false. A brooder may be so ventilated that the outside air is sufficiently warmed before reaching the chicks. Due attention should be given to see that it is kept at the right temperature, for if the temperature be kept too low or too high for a considerable length of time the result will be an unnatural growth of wings, and weak and sickly chicks. The chicks should be kept so that they will lie down and go to sleep and not be obliged to huddle together to keep warm, neither be forced to the coldest corner of the brooder to cool off.

Another thing to be considered is the number to be placed in one brooder. The brooders that I use are two and one-half by three feet; placed in one end of coops, which are three by six feet. Such a brooder will accommodate seventy-five chicks nicely; we have raised more than that, but that number or less is better.

After the right brooder, with the right temperature and the right number of chicks are obtained, the next thing to be thought of is the food and drink.

There are many different methods of feeding, many of which we have tried with good results, but perhaps as good, if not the best method of feeding, for the first four or five days is oat flake and millet, with a few bread crumbs fed four times a day. After that gradually work them on to a mixture of cornmeal, wheat middlings, and wheat bran, with a few beef scraps for their mixed food, and cracked corn and wheat, which should be given after they have eaten their mixed food. Close attention should be given to the droppings, and if they do not become hard in two or three days a little black pepper may be mixed with bread crumbs moistened. Care must be taken that none of their mixed food be sticky or gummy.

Another and perhaps one of the most important things to be looked after in raising chicks is their drink. They should have fresh water placed in clean drinking fountains. A fountain that can not be opened and cleaned never should be used, for a slimy substance will form on the inside of the fountain and unless removed will surely cause bowel trouble. Many persons have lost nearly all their chickens from this cause and then wondered why they are not successful. If by reading these suggestions some of your readers are helped in their struggle to make poultry pay I shall feel repaid for my effort.

A. A. HARTSHORN, New York.

Better Too Much Heat Than Too Little.

How easy to rear young chicks if we only knew what to feed, how to feed, when to feed, and how much to feed, and a thousand other hows, ifs and ands.

In our years of experience in rearing chicks in brooders and by mother hens we find the results about the same in regard to the number raised and cost of food. But chicks reared in brooders are more peaceable and quiet and much

more easily handled, hence make better show birds. We also find that we are not troubled so much with lice and disease, for the simple reason that remedies are more easily applied. Again, we have the use of the hen in the breeding yard, and save the food which she would eat if left with the chicks. This is a large gain in rearing thousands of chicks per year, as the food for young chicks is quite costly.

Our method of raising chicks in brooders is as follows: After leaving chicks in the incubator or under the hen until twelve or thirty hours old, we place them in the heated brooder, with the thermometer registering ninety degrees, allowing the temperature to fall until the chicks are three weeks old, after which we use no artificial heat.

In regard to pen room, I have raised as high as two hundred chicks in brooders four by eight feet, and one hundred and sixty-five chicks in brooder three and a half by six feet, and lost only one chick (and that one in the small brooder) this season. We never have had as good results with small brooders. We leave our chicks in brooders the first two or three weeks according to the weather, and give them a run in the yard ten by twenty feet, until six to eight weeks old, after which we place them on the farm. After trying many experiences with good as well as poor results, we find this the most successful of all, with no extra trouble or expense. Any one can rear a brood of chicks in this way.

We offer a few suggestions in regard to feed and heat while chicks are in brooders and small yards. If you wish to avoid bowel trouble, give clabber milk once a day. We have learned this rule: Better have chicks two degrees too warm than one too cold. When chicks are too warm they will scatter over brooder and when too cold will crowd over one another, smothering weaker chicks.

We always feed one teaspoonful of sulphur in food to fifty chicks, twice per week during dry weather. This we think aids the feathering.

IRA T. MATTESON, Ohio.

How to Successfully Raise Brooder Chicks.

One of the first things to be considered in raising brooder chicks successfully is the parent stock which must be in perfect health, properly fed and given abundant exercise to insure fertile eggs and strong chicks. A first-class incubator must be selected, one that will hatch from 75 to 90 per cent of fertile eggs, and when you get such hatches you will get strong chicks that will live if properly cared for. The next thing to be selected is a brooder, and this is equally if not more important than the incubator. You must get a brooder that imitates a hen as closely as possible; one that will let in any amount of fresh air; one that has a round cylinder with no corners for chicks to crowd in, and one easily heated with a lamp that will not blow out nor smoke. I prefer the single brooders to the pipe system. In winter heat your house to 60 and 70 degrees and keep your brooders 90 degrees at the start, gradually lowering the temperature after twelve days, or do not let the chicks get chilled at any time nor allow them to crowd, for if you do bowel trouble will be the result which will take off a large per cent in a short time. Too much heat will weaken them and cause many to die, so you must be very careful, especially at night, about obtaining the right temperature, as it often grows very cool the latter part of the night, so a little extra flame should be left on in cool nights.

I use runs five feet wide, ten feet long inside of house, and outside runs fifty feet long well shaded in summer.

The next and most important of all is food. I wish to say right here that overfeeding for the first four weeks of a chick's life has put more people out of the business than all other things combined. You can hardly feed too little. We feed four times a day for the first five weeks. The first three weeks we use principally dry food and make them scratch for every meal but that given at night. We feed Spratt's Patent Chick Feed morning and night. At ten and two o'clock we feed millet seed, pinhead oatmeal and cracked wheat. We keep them well bedded with cut clover two to three inches deep, and throw all their feed in this. They also eat much of the clover. We feed very sparingly at first. Keep them hungry at all times. Much depends on keeping them at work; it assists in keeping them in good health. We keep grit and charcoal before them all the time, and fresh water is always before them. Care must be taken to keep their drinking dishes free from slime; they should be washed daily. Clean your brooder every other day if you bed with cut hay, and every day if you use sand or bran.

After three weeks your chicks will begin to tire of this feed, then we give two meals a day of soft food composed of one part stale bread soaked in water, or better, milk, one part bran, one part hominy meal, ten per cent Spratt's Ground Meat. H. O. Poultry Food with ten per cent good beef scraps is a grand growing food and much more easily prepared, but more expensive. We continue Spratt's Chick Feed once a day for two weeks longer, giving mash morning and night, using cracked corn and wheat once a day. If running for broilers make your mash one-half cornmeal. We run but fifty to sixty chicks in one lot, as this is enough for any single brooder if you want them to live.

After they are old enough to leave the brooder and you cannot give free range make yards twenty feet wide by one hundred feet long and put sixty to seventy-five in a flock on grass yards with plenty of shade, dividing the pullets from the cockerels. Keep them free from lice and you will have birds of fine quality for breeders.

EDGAR BRIGGS, New York.

Principally a Question of Moisture.

"I can hatch the chicks easily enough, but to raise them is the question." This expression is very frequently heard from those raising poultry by artificial methods.

I have done a great deal of experimenting along this line during the past eight years. Some seven years ago I thought I had struck the right idea for brooding young chicks when first hatched. I had three separate houses, 7x12. I built flues on each of these houses and put indoor brooders in them, also a small stove. Now, for the results. The chicks did fine for about a week and I thought now I am on the road to success, but, lo! I went to feed them one morning and a number of them looked like big toads swollen to nearly double size. I removed the stoves and the trouble stopped. I then worked along a few years with indoor brooders and cool, dry houses with varied success. In 1899 I commenced with outdoor brooders. This season I have used nine of them, raising some broods nearly to a chicken, while losing some broods almost entirely—all losses except a few with the universal disease, bowel trouble. Those brooded with hens occasionally died in same proportion. I concluded from observation that it was moisture and not the food that caused the trouble, as I noticed if the weather was dry whether the temperature was high or low I raised about all the chicks, and also if I got them by the first ten days without bowel trouble they were all right. To satisfy myself that it was moisture the first week or ten days that gives them bowel trouble I put several hens with chicks up in a loft for a week. It was perfectly dry in this loft and I never lost a strong chick after this experiment. From this experience I shall construct a room in the loft of

some of my buildings next season with plenty of light and ventilation without fire except in the brooder and keep all incubator chicks up above the ground for the first ten days.

A good many perusing this article will say, "He has not said a word about food." I don't expect to say much about food as it is immaterial what you feed if you solve the moisture problem. I can raise every chick hatched, as I have done it, on the same food I feed old fowls when there is no moisture to contend with. Give the chicks plenty of grit and clean water, a little green food and you can safely feed them any food you may have, if you keep them free from moisture the first two weeks of their lives.

As to space required for brooder chicks, of course the more the better. With my outdoor brooder chicks I use three boards making a triangular yard, the sharp angle coming up to the brooder, using two sixteen and one twelve-foot boards one foot wide. I keep them in this yard with plenty of chaff to scratch in until they get large enough to fly over the board. Then I cut small openings in the boards for them to go out and in at will. If you have limited space this yard will accommodate probably forty until near frying size if you are careful about sanitary conditions. I am enabled to put forty to sixty in brooders three feet square, and keep them in these at night until frying size is reached. I then cull and run them in a movable brood house until four or five months old, gradually moving the brood house nearer to permanent house, and finally moving brood house away.

O. E. SKINNER, Kansas.

Care of Brooder Chicks.

It might be of some advantage to some of the readers of the R. P. J. to know how we raise brooder chicks. While I have never raised brooder chicks extensively I have been very successful, raising from 75 per cent to almost every chick. At one time, out of a hatch of seventy-nine chicks, I raised seventy-seven to maturity.

These birds were brooded in a home-made brooder heated with hot water put in gallon jugs, using two of them. I used flannel strips tacked to common laths resting at each end on a cleat nailed to the side of the hover. I use a broad board for a partition dividing the brooder into two compartments, cutting a small opening in the partition board for a passway for the chicks to the run. This part of the brooder has a glass in the top about 16x24.

These birds were hatched about March 1st. The first thing we do with our chicks after hatching them is to place them in small baskets with some flannel cloths in them, wrapping up good and warm—keeping them in that way until twenty-four hours old. By that time I have some fresh corn bread baked just as we use it for our table. Before feeding them I place them in the brooder, which is now heated up to a temperature of about 85 or 90 degrees. The bottom of the brooder is covered with coarse sand, which I allow them to work in about an hour or two before feeding—then I feed them the corn bread crumbled up fine, putting it on the floor in the sand. By this time the little fellows are getting hungry (having absorbed all the egg food that nature has left for them from the egg) and they begin to eat the little bread crumbs and sand with a pretty good appetite. Only feed them a little. In about two hours or more I put in a little more of the corn bread, and so on, feeding four or five times the first few days. When they are three days old I give them a little warm water to drink, but not much. After drinking I take out the little water pan, and again in the afternoon give them a little more. When three days old I boil an egg thoroughly done until the yolk crumbles and feed them that, changing off with the bread crumbs. After four or five days old I begin to feed them a little rolled oats or fine cut oatmeal and some small bits of meat reduced small enough so they can eat it. Now I vary feed quite a little. Feed boiled potatoes, oat meal, corn bread, chopped onions and potatoes, ground corn and whole wheat. When two weeks old I feed them ground corn mixed with bran and shorts, one part corn to two parts bran and shorts. I pour hot water over the mixture, scalding it, but only enough to mix it in a stiff or crumbly mass and feed when cool. I never feed wet and sloppy food, as it creates bowel trouble. We aim to keep our chicks in medium small runs until feathered out, then we give them a good deal of range until about half grown, and then I turn them out to all the range they want, allowing them to go at will over the farm.

After chicks leave the brooder I divide them into broods of fifteen to twenty to each coop, giving them plenty of fresh air at night, except when it is cold, then close brood coops up so as not to chill them. There are lots of good brooders made, and if properly run they are a success.

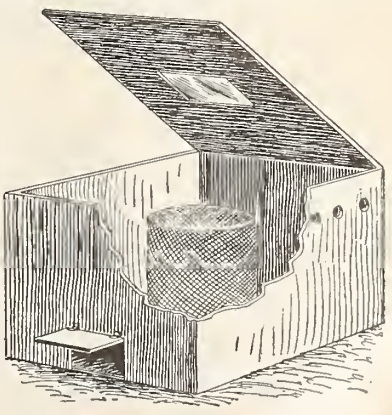
There is a great deal in keeping the proper heat for the little fellows, and proper feed and regular attention. Never allow your chicks to get chilled if you can help it, and after the second week don't let the heat in the brooder run over 80 degrees, and at night always see that the little fellows are snug under the hover, and when you feed always leave them a little bit hungry, and the next time you come to feed them they will all be glad to see you.

C. B. SAYERS, Pennsylvania.

Brood Coops and Methods of Brooding.

In answer to your letter asking me to give my experience in raising chicks with incubators and brooders and my way of feeding young chicks, I may say that I have had experience with incubators and brooders in a small way only, as it is quality not quantity that I have been striving for the last fifteen years. I try to mature only about five hundred birds each year, and those as good as possible.

The first forty chicks I hatched I put in a brood house nine by sixteen feet, with a partition across the center, giving them one-half of the house. Attached to this house I have two yards, one for each part of the house. These yards are nine by sixteen feet each, and I keep them dug up for the chicks to scratch in. Next to these yards I have a grass run, and as soon as the chicks have been in the house a few days I give them full range, always feeding and watering them in the yard or house. They soon get used to the place and will go in and out themselves. In this house I place a home-made brood box about three by three feet, and two feet high. At the side of the box down near the bottom I make a small door for the chicks to run in and out. The top I use as a door, hung on leather hinges, with a small pane of glass in it to admit light. This lid I raise and lower for ventilation. In the center of the box I place a wire screen about the size of a peck measure, and the first night or two, or any night that the weather should be cold, so that there might be danger of the chicks crouching or piling up, I place a lantern in this center screen.



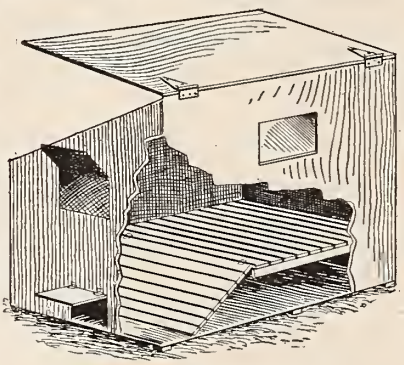
Home-made Brood Box.

When my second hatch of one hundred and one chicks were three weeks old I took them out of my brooder again

to make room for the third hatch, which I found this time to be one hundred and two chicks from one hundred and nineteen eggs. The second hatch of one hundred and one I put in the other half of the brood house and handled them the same as the first lot. I found when I took the second lot to the brood house at three weeks old that I had lost two chicks, leaving ninety-nine strong, healthy chicks. The two hatches that I put in the brood house were put in the last of April and the first part of May, and until the time of this writing (July 12th) I have lost but one chick.

The third hatch of one hundred and two chicks at three weeks old I took out of the brooder again to make room for the fourth hatch, which proved to be one hundred chicks from one hundred and twenty eggs.

The third hatch of one hundred and two and all chicks hatched at this time of year at three weeks old I put outside in a home-made brood coop made three feet wide, five feet long, four feet high on high side and two and one-half feet high on low side. The whole top I hang on hinges, and use it for a lid or door. In the center of high side I place a pane of glass so as to open and shut, with a wire screen over the inside of opening. In each end of the coop up near the top I leave an opening covered on inside with wire screen. Over these openings on the outside I hang a lid to open and shut for ventilation, which, when open, forms a roof to keep out the storm. In one end of coop down at the bottom I make a small door for the chicks to go in and out, and in the other end of coop I place a brood box made the same as the one described for the brood house, and when the chicks are old enough I take out the brood box and put in place of it a roosting rack made out of slats placed a little way apart, so as to admit air from the bottom. This rack is made so as to fit in one end of the brood coop on cleats nailed to sides of coop ten inches from bottom, so that I can take the rack out to clean it. In front of this rack and hinged to it I place a slat gate which drops down from rack to floor, forming a gate to keep the chicks from running under the roosting rack and also forming a ladder for the chicks to run up and down on.



Home-made Brood Coop.

I put these brood coops around in different parts of the yard under trees, placed so that the morning sun will strike one end of coop and so that it will be in the shade through the middle of the day. In front of these coops I place a small yard in which I shut the chicks for the first two or three days, till they get used to their new quarters, then I open the yards and let them have full range, always feeding and watering in or near the coops. In this way of brooding I have had the greatest success raising chicks.

My experience has taught me that it is almost impossible to raise chicks that are not properly incubated, when the weather gets real warm I find it necessary to cool the eggs for a long time. I leave them out of the incubator and leave the door open from an hour to an hour and a half till they are thoroughly cooled, and then the chicks will hatch out strong and quick and are easily raised.

I find it best not to put more than fifty chicks in one brood coop, as they will do much better than though there were more in one coop. Fifty chicks in a coop the size that I have described will do well and grow one-third faster than one hundred in the same coop; even if you make the coop twice the size, the fifty will do far better than one hundred or more in one lot.

My method of feeding young chicks is as follows: For the first five days I give them nothing but steel cut oats and dry wheat bran, keeping grit and fresh water before them at all times. For the next five days I feed much the same with a little variety added, such as cornbread made out of corn meal and wheat bran. I also feed a little cracked wheat. After they are ten days or two weeks old I begin to feed cracked corn, whole wheat, a little millet and sugar cane seed, green cut bone twice a week and later on a few sunflower seeds. Chicks are like Yankees, they like a variety.

WILLIAM WEBB, Illinois.

RULES FOR RAISING CHICKS IN BROODERS.

BY P. H. JACOBS.

1. If the chicks do not come out of the eggs until the 22d day, or longer, it indicates that the temperature of the egg drawer was too low. They should begin to pip on the 20th day.

2. If they begin to come out on the 18th day it indicates that the average temperature was too high.

3. If chicks come out weak it indicates either too high or too low a temperature, or that the eggs were from immature pullets or over-fat hens.

4. Give no food for thirty-six hours after the chicks are hatched.

5. They should then be fed every two hours until one week old. After that time feed four times a day until a month old, when three times a day will suffice.

6. Keep a little box of ground charcoal, one of clean ground bone and one of small sharp flint before them, with plenty of coarse, sharp sand on the floor; also a box of ground oyster shells as grit, but in recommending these substances it may be stated that any kind of sharp small grit will answer.

7. The first feeding may be of pinhead oatmeal; rolled (or flaked) oats are ready prepared, and can be had of any grocer, being the prepared oatmeal for instantaneous preparation of oatmeal gruel. Feed them to the chicks dry, but they should not be used except as a variety, the pinhead oatmeal being preferred. Stale bread moistened with milk may also be given. Crumbled stale bread fed dry is also an excellent food.

8. On the third day after beginning to feed vary the food by giving the oats one meal and prepared cake the next. The prepared cake is made by using equal parts of bran, ground corn and oats (corn and oats are usually ground together) and middlings (shipstuff), which should be salted to season it, intimately mixed, and cooked in a pan in the stove oven. Sift the corn and oats first, and feed the coarse parts to fowls. If fresh milk can be had the

food may be mixed with it before cooking; if not, use water. Crumble the cake fine when feeding. It should be fed dry.

9. Millet seed, a gill to 100 chicks, may be scattered in litter, between meals, to induce the chicks to scratch, but never leave in the troughs food that is not eaten.

10. Ground meat is sometimes used for chicks, but results show that too much of it causes bowel disease. If a piece of lean butcher's meat be cooked to pieces (or chopped fine after cooking), and fed twice a week, it will be sufficient. A gill of linseed meal to every quart of the dry mixture (for making the prepared cake) given once a week, will be beneficial.

11. After the first week any kind of food, such as mashed potatoes, cooked turnips, crumbled bread of any kind, or any wholesome food, will be of advantage.

12. When ten days old the oats may be omitted, and wheat one day and cracked corn the next may be used. Begin to teach chicks to eat wheat and cracked corn early by sprinkling a little on the floor (about a tablespoonful daily) after they are a week old.

13. Young chicks do not eat much at a time, but they eat often. Do not omit a meal. Feed at regular hours.

14. After the chicks are three weeks old the cake may be omitted, the food being varied instead, but the quantity of bran should be reduced one-half.

15. Bran is indigestible if fed raw, and sometimes causes bowel disease, but if cooked or well scalded, so as to soften it, the bran makes a good food, as it largely abounds in the phosphates, being the best bone-forming element that can be given.

16. Water should be given in a manner that only the beak of the chick can become wet. The chicks must not be allowed to tread in the water. Dampness is fatal.

17. Get some fresh stone lime, slack it with boiling water, then make a quantity of lime water. Keep it in a jug, corked. To every quart of drinking water add a gill of the lime water.

18. If the chicks appear weak, or have weak legs, from rapid growth, put a teaspoonful of tincture of iron in each quart of the water.

19. A young chick is naked, like a babe just born, the down being no protection, hence everything depends on plenty of heat. Better have the brooder too hot than too cold. If the chicks are with hens they must have a warm, light place, as a hen cannot raise chicks in winter as well as it can be done artificially, as it is not her natural period of the year for so doing.

20. No thermometer is needed in the brooder, or under the hen. If the chicks crowd together, especially at night, they need more warmth. When they shove their heads out of the sides of the brooder, or from under the hen, the heat is just right. Whenever the chicks do not sleep near the edges of the brooder, but get as close to each other as possible, give them more heat.

21. When the chicks show signs of leg weakness, have clogging of the vent, and bowel disease results, there is a lack of warmth in the brooder, especially at night. The night is when the chicks meet with the greater number of difficulties.

22. When chicks have leg weakness, and the floor of the brooder is very warm, the cause is too much bottom heat. Bottom heat is excellent for chicks until they are a week old, but after that time there should be only warmth enough on the floor to not have the floor cold. All warmth should come from over the chicks. They feel the warmth on the back with more satisfaction than on any other portion of the body.

23. When the chicks have good appetites, but have leg weakness, the chicks move on their knees, but otherwise appear lively, it denotes rapid growth, and is not necessarily fatal. Follow directions in paragraph 18.

24. Feed the chicks on clean surfaces, or in little troughs; never leave the food to ferment. Clean off the brooders and floors daily. Keep dry earth in the corner of the brooder house for the chicks to dust in.

25. When you see the chicks busy and scratching, it is a sign of thrift.

26. A single night may ruin all. Never let the brooder become cold for an hour. Once the chicks get chilled they never fully recover.

27. When the chicks seem to be continually crying it means more warmth needed. The warmth is more important than the food.

28. If the chicks are stupid, drowsy, continually cry, or have fits, look on the heads and necks, and under the wings for the large lice. Also examine for the little red mites.

29. Never feed raw corn meal to very young chicks. Crumbled stale bread is always good for them.

30. Clover hay, cut very fine, and steeped in boiling water over night, and sprinkled with corn meal slightly, fed three times a week, is excellent, but unless it is exceedingly fine the chicks can not eat it. One of the best invigorators, however, is the decoction from the clover (clover tea) given in place of the drinking water occasionally, but it must be fresh and not stale.

31. Drinking water in winter should be tepid, not cold, and always fresh and clean.

32. Feed very early in the morning, as soon as the chicks came out of the brooders. Never keep them waiting for their breakfast. Do not leave food over night, as it may sour. Get out of bed and feed them.

33. Milk may be given, but should be fresh and the residuum carefully removed, but do not substitute it for water. Give water to the chicks from the start. Curds may be given two or three times a week. Also fresh buttermilk. Milk, however, is not necessary where it is difficult to procure.

34. A chick should weigh a pound when five weeks old —the average is a pound at six weeks old. It should be ready for market when eight weeks old. To fatten for market give plenty of wheat and cracked corn.

35. The White or Brown Leghorn male, crossed on Brahma, Cochin, Wyandotte, Langshan, Dorking, or Plymouth Rock hens, or grades, make excellent broilers. The Houdan crosses on large hens produce fine broilers. The Wyandotte and Plymouth Rock males are also excellent. The best results in hatching is when the Leghorn male is used.

36. Hatching should begin in October and end in April or May, but may really begin at any time. The best prices are obtained in April and May.

37. It costs five cents in food to raise one pound of chick. The cost of eggs, labor, buildings, etc., is extra. The heaviest cost is in the eggs (which are high in winter), as they often fail to hatch.

38. Hens are better than pullets for producing broilers. The males should not be less than twelve months old.

39. Eggs from hens that are fat, molting hens, immature pullets, or from hens in the yard with cocks having frosted combs, chilled eggs, or very small eggs, will not give good results.

40. Never try to save work. One-half of the failures occur from parties desiring the incubator to work without attention. Too much faith in the regulator is dangerous. You must always be "on deck." P. H. JACOBS.

POULTRY FOODS AND FEEDING.

The Production of Muscle, Bone, Flesh, Feathers and Eggs Demands Food Containing the Elements of Such Formations—The Necessity for Animal and Vegetable Foods—The Body of the Fowl—The Composition of Foods—The Nutritive Ratio—Individuality—Digestibility—Feeding Chickens and Mature Fowls.

By Robert H. Essex, Associate Editor Reliable Poultry Journal.

Chickens are easily hatched—not so easily reared. A machine will do the hatching, but it needs something more than an automaton to do the rearing. Hens are easily fed, but they are not so easily "fed to lay." From the time the chick leaves the shell to the moment she gives her last cackle, foods and feeding play important parts in the effort to make the greatest profit with the smallest expenditure. Whether the object be to perfect a fowl for exhibition or for market, or to secure best results in egg production, correct feeding is half the battle. Is it to be supposed for a moment that grain alone will satisfactorily build up the muscle, the bone, the flesh and the feathers? "It has done so on many a farm", you say.

Yes, but the range enjoyed by fowls on the farm has not entered into your consideration of this question. The range furnishes grass and clover—bulky vegetable food; insects, worms, bugs and beetles— animal food; and the fowl exercises its instinct in securing sufficient quantities of these to properly balance the grain thrown to it by the farmer.

Intelligence should be exercised by so balancing the ration as to secure the most rapid and proportionate growth of plumage and body.

Sometimes as fall approaches young cockerels are noticed to have gained weight and grown so fast that, as in the case of lanky children, their limbs refuse to bear them, and leg-weakness ensues. To guard against such cases food should be provided to build up muscle and bone, and care should be taken that too much fat forming food is not fed. Frequently we find in fanciers' yards pullets laying at the age of four and a half to five months where it would have been more satisfactory to the owner if laying had been postponed for a month or two. The pullets have been fed generously with animal food, and are laying at the expense of growth—size. There are times when laying may with profit be hastened, on other occasions it pays to let the fowl acquire its proper growth before laying begins. Hens are sometimes fed heavily by their owners who wish to procure more eggs. For a short time this is effective, but if the food is not properly balanced it will be found that the eggs gradually dwindle in number and size, and that the fowls become too fat or too thin. If the food is composed chiefly of grain and animal food, that is, if it be balanced and an excessive quantity supplied, the hens become over-fat, and the desire to incubate comes upon them. If the food is unbalanced or composed wholly of grain, even though they may be overfed, they become thin, starving for food in the midst of plenty—indigestion and death follow. If when the hens had arrived at the height of their laying ability their food requirements had been studied, the ration properly balanced, and the food limited in quantity, they would have continued to lay regularly, the incubating period would have been postponed, and instead of being only fairly profitable, they would have well repaid their owner for the exercise of intelligence in composing the ration, and feeding it rationally. How many

breeders are there whose male birds, as they become aged, rapidly lose weight and vigor? The cause in many instances is incorrect feeding. The old cock is cooped, and fed grain, grain, grain, and if he wants a change he is at liberty to gnaw the sides of his coop as a horse would do.

We have named only a few of the results of improper feeding as applied to cocks, hens, cockerels and pullets, yet sufficient to show that there is need of consideration, at least by the men who are meeting these obstacles.

"Contented-looking meat-fed ducks"

Necessity for Balanced Rations.

Advanced dairymen have long known that foods in stated proportions give better results in milk production than unstudied rations. One ration is suited for fattening, another for the production of milk. In the words of a Kingston, R. I., Experiment Station report, "Flesh, blood, nerves, tendons, horn, hair, wool, and the casein and albumen of the milk can only be formed from such foods as contain protein (nitrogeneous matter), for in starch, sugar, fat (carbohydrates), and the other plant constituents, whose function is to produce heat and energy, the necessary nitrogen is wholly lacking. If a milch cow is fed too much protein and too little starch, sugar, fat and other carbohydrates, some of the protein must be used by the animal to fulfill the functions of these substances. This is extremely poor economy, since protein is the most expensive of all the constituents of feeding stuffs, and, furthermore, such treatment would not be the best for the health of the animal. If too great a proportion of carbohydrates and fat is fed, the animal is kept in an abnormal condition, the yield of milk is reduced, and an undue laying on of fat results."

This applies with equal force to the feeding of fowls. The ration must be balanced, as well for economy's sake as for the attainment of desired results.

Necessity for Animal Food.

No fowl can thrive on a continuous supply of only one kind of food. It must receive both animal and vegetable food.

There appeared in this Journal a report by James R. Covert, of the United States Department of Agriculture, which bears out this statement. Two flocks of ducks were subjects of experiment. One flock was fed grain, and received no animal food. The other was fed a balanced ration which included meat. The author said, "Before the experiment had been long under way it was noticed that the meat-fed birds were developing rapidly and evenly; but the grain-fed ducklings were becoming thin and uneven in size. It was sometimes almost pitiful to see the long-necked, scrawny, grain-fed birds, with troughs full of good, apparently wholesome food before them, standing on the alert and scrambling in hot haste after the unlucky grasshopper or fly which ventured into their pen; while the contented looking meat-fed ducks lay lazily in the sun and paid no attention to buzzing bee or crawling beetle."

Another experiment bearing on this point covered the analysis of the stomach contents of some thousands of wild birds—birds that had been at liberty to pick up here and there such foods as nature demanded, instinct suggested, and taste preferred. Generally vegetable food was found to be in excess of animal food, the average proportion being about one-third animal to two-thirds vegetable. This experiment chiefly applied to birds obtained throughout the year, but it was found that in those secured during summer months animal food about equalled vegetable food.

These instances impress us with the importance of supplying animal food to poultry. Wild birds enjoy it and are at their best during the season when it is obtainable. Domestic fowls dwindle and feel miserable without it.

In an experiment on feeding growing chickens a West Virginia University authority concluded that animal protein was necessary to the welfare of the chicks. In fact, among those that received no animal food several died of roup and "none of them were in a healthy, vigorous condition." The conclusion arrived at was that "a certain amount of animal protein seems to be necessary for poultry." The opinion was further expressed that the lack of it was in great part the cause of poor development.

Let us consider this branch of the subject in its relation to the production of eggs. The Utah Experiment Station in its report on an experiment in feeding poultry sums up as follows: "Pens 12 and 15 * * * had about half their total food in wheat. In addition pen 15 had dried blood. A study of the Leghorn pens 12 to 15, inclusive, brings out the fact that pen 15 (fed dried blood) made much better early laying than either of the other three pens. This would seem to point to the conclusion that the feeding of blood induces early maturity in layers. * * * Dried blood is very rich in protein indicating a high feeding value in an egg ration."

"Long-necked, scrawny grain-fed" ducks that received no animal food.

Poultrymen often possess chicks that feather slowly, some being nearly bare of plumage. Such chicks are found in most flocks of general purpose fowls, also among the larger breeds. A special system of feeding for the produc-

tion of feathers would clothe these individuals with up-to-date apparel when they would no longer be conspicuous by reason of their nakedness. Feeding an ordinary ration does not effect this. These singular cases require special treatment; they are differently constituted. What is the experience of observant fanciers regarding these scantily feathered birds? It is that aside from the squabs which die from lack of protection from cold or glaring sunshine, the birds which feather slowly are the biggest and heaviest of the whole flock. The food that in the majority of the flock has produced feathers and growth, has in these individual instances produced growth only. This divergence simply illustrates the necessity for observation in the poultry business. Just as "circumstances alter cases", so do individual fowls and even individual flocks upset calculation, and treatment must suit the case.

Necessity for Bulky Vegetable Food.

The feeding of what is ordinarily known as green food is no less important than the provision of animal food. "Bulky vegetable food" is a better description than green food, for it is not always used in its green state (in winter, for example), and one of the advantages of its use is its bulk, which assists digestion by breaking up or separating concentrated food. Such a designation distinguishes it from concentrated vegetable food in the form of grain; includes roots (beets, etc.) and at the same time retains the application to green food proper.

The West Virginia Experiment Station thus summarizes the result of an experiment in feeding bulky vegetable food: "During the 360 days, each fowl when liberally supplied with green food consumed 58 pounds of beef scraps, ground fresh bone and grain. During the same time fowls which did not receive green food consumed 61 pounds of the same materials. * * * White Leghorn fowls which were at least five years old laid 114 eggs each when supplied with an abundance of green food and only 90 eggs when not supplied with green food. In view of the fact that in practice the presence or absence of green food would exert its greatest influence in winter when eggs are highest in price, it would seem very important to supply fowls during that season with some kind of green food, and in summer to allow them a run sufficiently large so that there will be an abundance of succulent vegetable matter for them at all times."

It will be noticed that the supply of bulky vegetable food reduced the cost of feeding and increased the number of eggs laid. Several experiments along similar lines have been conducted at different stations and results have almost invariably shown that "green" food is absolutely necessary for the health of the fowls. Experienced breeders generally agree on this point and no further evidence is necessary.

Feeding a Variety of Grain.

We have not discussed the advisability of feeding grain. Every breeder feeds it; nobody disputes its value, and therefore we need go no further just now than to remind our readers that experienced feeders advocate a variety. Changes are healthful, and this advocacy of a variety of grain is responsible for the success of many who have followed the suggestion. Some of those who uphold the feeding of a variety of grain smile at the idea of balanced rations, never thinking that the basis of such rations is variety. Indiscriminate feeding of numerous grains is simply a slovenly method of balancing the rations, and the very men who smile at the balanced ration "theory" advocates are themselves adopting the theory—are carrying it out in a very slipshod fashion and don't know why; their sole argument being that a variety is beneficial. In this argument we agree with them, but feel induced to ask—Why?

The Body of the Fowl.

We have pointed out the danger incurred by feeding continually one kind of food; we have also presented evidence that in feeding balanced rations satisfactory results have been secured. The disastrous results of omitting animal and bulky vegetable food from the ration have been noted, and instances have been furnished to illustrate the advantages of supplying these foods. Having gone thus far and taking it for granted that the reader acknowledges the advisability of feeding for the best results, we will discuss the composition of the fowl's body, also of the foods that are to afford it nourishment.

Primarily the object of feeding is to provide for growth of the fowl—to form muscle, bone, flesh, fat and feathers. When we know the composition of the body, we will be able to decide what is needed for growth and to make up for the waste of material that is always going on, in other words—to provide for wear and tear.

Animal bodies are composed of protein, fat, ash and water. We need not now consider the substances which come under these heads. It is enough to know the uses to which they are put.

Protein is the most important of these compositions. Its function is to build up muscle, nerves, flesh, blood, feathers, etc. The peculiar value of protein (nitrogenous matter) over other substances to be mentioned later (non-nitrogenous) is that while performing this special work it can also build up fat and afford heat to the body, but does so as it were under compulsion, and only when these requirements are not provided for otherwise. The substances that naturally officiate in the capacity of heat and fat formers cannot take the place of protein in the formation of nerves, flesh, blood, etc., and they are therefore deemed of minor importance. The white of an egg is made up nearly entirely of protein, and this fact alone will appeal to poultrymen as showing the importance of providing it in sufficient quantity. As well let the fowl remain without water as without protein, and it is general knowledge that nearly three parts of an egg consist of water.

Fat is of value to the body as producing heat and furnishing energy to replace the amount that has been exhausted by bodily action. Poultrymen feed corn in winter to produce heat of the body. Any surplus corn that is fed will in the case of healthy fowls cause an accumulation of fat. A certain amount of heat is always needed by the body aside from that furnished by the sun. In summer, therefore, as in winter, food must be supplied to produce fat. We do not wish to be mistaken as saying a fowl must be fat in summer to be healthy. Not at all; but simply that a quantity of fat must be present throughout the year, sufficient for the bodily requirements; yet not so much as to call for the designation—a fat fowl. There are other substances which form heat for the body. They come under the name carbohydrates, and will be considered separately.

Ash is the substance which remains after the combustible matter has been consumed—burnt. It consists of mineral matter and is made up chiefly of potash, lime, magnesia, iron, and phosporic acid. Its function is the formation of bone. Most foods contain a large quantity of ash and it is not often that difficulty arises through its absence.

Water forms a large proportion of all bodies. The actual percentage depends upon conditions, and as water also enters into the composition of all foods we need not further consider it in this connection. It may, however, be well to add that after water has been removed from food, the remainder is described as "dry matter."

So much for the body of the fowl, and now for the composition of foods which are intended to supply its needs.

The Composition of Foods.

All foods are made up of protein, fat, ash, water and carbohydrates. The first four named have been discussed under the previous heading, as they are properties contained in the body of the fowl. The last named in its work is much the same as fat and is generally classed with it. Carbohydrates are such substances as sugar and starch. If these are burnt in a fire they create heat, and this illustrates their work in the body. The consumption of these foods by a fowl has the same effect as burning them in the fire—the formation of heat.

The value of a food is judged by the amount of protein it contains. An increase in the amount of protein increases the value of the food, while an increase in the amount of carbohydrates decreases its value. The reason for the extraordinary value of protein has been given.

The Ration.

A ration is stated to contain proportionate amounts of carbohydrates, fat, and protein, the latter being the basis. The proportion of these substances is termed the nutritive ratio, and taking wheat as an example would be written—1:9.9, that is to say wheat contains one part protein to nine and nine-tenths parts carbohydrates and fat. Although it would be better to give the amount of fat separately, the scope of this article does not render it absolutely necessary, so for simplicity's sake we combine fat and carbohydrates. It is unnecessary that we should explain the process by which carbohydrates and fat are equalized for the sake of such combination. Fat is two and one-quarter times as effective as carbohydrates, and this has been taken into consideration. As we have said some foods contain a greater proportion of protein than others. Their values are correspondingly greater or less. Oats are more valuable than wheat, that is the digestible portion, as they contain one part protein to less than six of carbohydrates and fat. Peas are even more valuable, containing one part protein to less than three of carbohydrates and fat. In skim milk, linseed meal, cottonseed meal, etc., the proportions are nearly equal, being about one of protein to one and six-tenths carbohydrates and fat, while in corn the nutritive ratio is about 1:12. It will be observed that the quantity of protein present in all these foods is comparatively small. In an egg protein predominates.

Before leaving this branch of the subject reference may be had to the statement made above that both animal and vegetable matter contain protein; also to the statement that it is necessary to feed both animal and vegetable matter to fowls. It may be asked—If this valuable substance is contained in both animal and vegetable matter, why should there be an absolute necessity for feeding both? Why should not animal protein or vegetable protein suffice for all purposes? Because there is a difference in protein. There is a something that has not been determined but which has an influence on the utility of food that renders it necessary to provide both animal and vegetable protein, and experiments cited on previous pages prove this necessity. Not only that! Even vegetable protein differs in composition according to the source from which it is obtained, and this is another reason why a variety of grain should be fed.

In forming a ration it must not be forgotten that a portion of all foods is left undigested. Only the digested portion can be of any bodily benefit, and it is difficult to arrive at a decision as to what proportion of a food a fowl digests. Here again the intelligence and observation of poultrymen must be brought into operation. Analyses furnished by experiment stations are assumed to contain only the digestible portion of foods, but as they have been based upon experiments with cattle, there will certainly be a difference in the digestibility as fed to fowls, and this difference must be discovered by observation until experimenters have solved the problem.

Wide and Narrow Rations.

Rations possess either a wide, medium or narrow ratio. A ration containing an excessive proportion of carbohydrates and fat is said to be wide. As the proportion of protein is increased, the ratio becomes narrower. The standard ration for cattle ranges around 1:5 or 1:6 and experiments have disclosed that this proportion produces good average results. This is therefore termed a medium ratio. If the carbohydrates and fat were placed at 7, 8, 9 or more parts instead of 5 or 6, this would form a wide ratio; if brought below 1:5, say 1:4 or 1:3, it would be termed a narrow ratio. There is no fixed standard for poultry, and so breeders have used their own judgment in composing rations. Some prefer a wide ration containing an excessive amount of corn and other fattening materials, while others feed more meat, bone, wheat and such other combinations as form a narrow ration.

In feeding poultry, experiments that have been conducted have not conclusively shown that either a wide or narrow ration has any advantage over the other. One experimenter assumes that the wide ration is superior because fowls which were fed in the proportion of 1:5.6 laid better than those receiving a ratio of 1:4.7. The former was styled a wide ration, and the latter, narrow. As competent authorities place the governing standard at 1:6.8 and consider it a medium ration, it seems to us that neither 1:5.6 nor 1:4.7 should be termed wide. We prefer to consider that both are narrow. The conclusion then would be that a narrow ration (1:4 7) did not give such good results as one less narrow (1:5.6). There was nothing to show that a continued widening would prove proportionately advantageous. In another experiment it was assumed that a nutritive ratio of 1:4.95 was very much superior to one of 1:6.66 for Leghorns, while in the case of Plymouth Rocks "the results were inconclusive." In this experiment, as in the one before mentioned, neither of the ratios could be called wide, and although this approached nearer a true test by reason of the greater difference in ratios, the results were said to be inconclusive.

Corn and Wheat.

In the experiment last recited we fail to see upon what grounds it can be argued (as it was) that wheat is superior to corn for feeding fowls. Selecting from the twenty pens undergoing the test those which were more likely to give similar results, we are induced to say that four pens of Leghorns numbered 12, 13, 14 and 15 bought from the same breeder, and hatched about the same time, best meet our requirements. It was said that between pens 12 and 14 the results were inconclusive, yet one was receiving practically a wheat ration and the other corn. This fact suggests there was no difference in the feeding value of those grains. Pen 15 was selected as illustrating the desirability of feeding wheat. Certainly good results were given by this pen, but we find it was the only one of the four that received blood in the ration. Was not the blood as effective in producing those results as the wheat? In fact this very circumstance is argued in another portion of the report in question. So as between corn and wheat the test proves nothing. We bring these conclusions before the reader to illustrate the necessity of taking for granted as little as possible, and to suggest that no experiment can be of value unless conducted upon carefully considered rations.

Other experiments similar to those mentioned have been made, but in most of them the conditions or rations

have been such as to render unavailing the conclusions arrived at regarding wheat and corn.

Not only the width of the ration, but also the foods composing it must be considered. This is more decidedly the case since in analysis fat is generally lumped in with carbohydrates, for with its aid a wide ration might be compounded that would have a very beneficial effect on egg production, notwithstanding the claim that a narrow ration is better for that purpose.

Individuality in Fowls.

Truthfully it is said that every question has two sides, and having illustrated the bright side of the balanced ration system of feeding, it is our duty to call attention to its drawbacks.

Before mentioning these we will state that it has no drawbacks other than those experienced under any other mode of feeding. More than that we may say—it has fewer drawbacks than any other mode.

Individuality in fowls forms the chief obstacle to perfect success in feeding. In fowls as in human beings, constitutions differ; habits and inclinations differ; and these variations demand a variety of treatment. The fact that under a certain regimen one hen in a flock lays 200 eggs a year is no proof that the other hens would not do better under a change of diet. It simply proves that this particular treatment is just the thing for that one hen. It is possible, too, that it is also the best for the flock, but it is not proven. By a change of food a greater number of eggs may be obtained from the flock, while a smaller number would probably be laid by the individual hen referred to. Food that induces one hen to lay 200 eggs a year may produce little else than fat on another. Grain that is carelessly fed to a flock of hens is not as a rule of general benefit, yet one or more of the hens may thrive upon it.

Both quality and quantity of food affect results. We have seen men first at the table and last to leave—men who make good use of their time while there, but never grow fat. We have noticed others who eat but little, yet fat seems to "grow on them." Sometimes these results are evidence of digestion or indigestion; at others they may be attributed to constitutional variations. The digestive organs may work satisfactorily, but the constitution—the breeding if you like—gives varying results. Our experience suggests that fowls are affected similarly, and to get best results these variations must be studied.

Digestibility.

Some fowls can and do digest such quantities of grain as would cause impaction of the crop in others, yet an excessive quantity of vegetable food would possibly prove indigestible to these individuals. This again brings up the question of digestibility, which has to be considered in forming rations. We have in previous articles drawn attention to the fact that it is the food digested, and not simply the food eaten, that we must look to for successful feeding. A proportion of the rations fed to fowls is indigestible and passes through the system without affording appreciable nutriment. This extra bulk must be considered in composing the ration, and to guide us we must for the present rely upon experiments conducted with cattle as subjects. A food containing an excess of crude fibre will be indigestible, notwithstanding analysis may show it to be rich in protein. We must remember, therefore, that to arrive at a correct conclusion on the value of foods it is necessary not only to include in our estimate the amount of protein, carbohydrates and fat, etc., but to consider its digestibility. Further—to secure best results we must not overlook individuality of fowls; and this last point can only be decided by the observation of the breeder himself.

Common Poultry Foods.

In some sections of the country it is easier to secure one variety of grain than another. Prices, too, differ in various sections and in feeding poultry in large numbers an increase or decrease in the price of grain is not to be overlooked. Taking these things into consideration we present a great variety of foods in the following list. If the poultry raiser finds one variety of grain is higher in price than usual he can choose another which is similarly composed and feed it. It pays to bear these things in mind.

We will now present analysis of foods generally fed by poultrymen. Their constituents have been treated upon in the earlier part of this article and readers who require information upon their uses and the divisions of the fowls' anatomy they are intended to nourish, may be interested in referring to that portion of the discussion.

In the following tables carbohydrates and fat have been placed in one column. Their functions are alike, but fat being 2.25 times more effective than the same quantity of starchy matter it has been brought upon a level with the carbohydrates by multiplying it in each instance by 2.25—diluting it as it were. As it is chiefly a question of proportion the bringing of these two items under one head simplifies the comparison.

We have said no difficulty has arisen through want of ash in foods when correctly balanced, and as water also is not lacking we will for the sake of simplicity confine ourselves to the main constituents of foods—protein, carbohydrates and fat:

A number of the foods listed are not in general use. They are, however, sufficiently common to warrant us giving them a place in the list. From time to time inquiries have been made as to the composition of a number of the seeds and meals mentioned, and we have included them for that reason. Take for instance, sorghum seed, oat hulls, gluten feed and gluten meal, hominy chop, malt sprouts, and rye, corn and oat fodders. These, as we have said, are not in general use, but a number of poultrymen are interested in knowing their value as foods.

The respective value of protein, carbohydrates and fat have been given, so the reader will be able to form a very fair opinion of their respective values even without figuring out the exact composition.

Successful Feeding.

To feed successfully requires more than ordinary care and thought. It would be absurd to give for any length of time a fattening ration to hens from which we wish to obtain a continual supply of eggs. It would be foolish to feed a fattening ration to young growing cockerels which give signs of leg weakness even under ordinary feeding; and the result of supplying young chicks large quantities of such a ration would be indigestion and death. Chicks require chick feed. Growing cockerels need muscle and bone forming foods. Laying hens require an egg producing ration, and fowls for market should have food especially prepared for the object in view. Fowls that are molting need feather making material, and if it is late in the season, more than the average amount of heat forming food. Fowls in course of preparation for show need a variety of food mixed with a good deal of experience. Fowls having free range need comparatively little consideration in the mixing of foods, while fowls enclosed must have a balanced ration.

The formation of an egg requires something more than the provision of foods corresponding in quality and quantity to the contents of the egg itself, otherwise egg production would be simple indeed. The nutritive ratio of an egg being placed at 1:2.5, it would remain to provide food pos-

sessing a like composition. We have, however, to consider that everlasting problem, "wear and tear" of the fowl. We have to provide for growth of the body, for production of heat, for the replacing of tissue worn out by exertion, and finally for the food that remains undigested. Herein lies the difficulty of approximating the egg ration, and herein too is the proof that individual fowls need individual treatment. The whole subject of feeding can, therefore, be determined only from the standpoint of averages—average conditions and average fowls. The breeder must be on the lookout for exceptional cases.

List of Common Poultry Foods and Their Feeding Values.

	POULTRY FOODS.	Nutritive Ratio. Protein.	Carbohydrates and Fat.
Grains.	Wheat	1	9.9
	Screenings (wheat)	1	5.2
	Corn	1	12.
	Oats	1	6.8
	Barley	1	8.
	Buckwheat	1	7.
	Rye	1	10.
	Peas	1	2.8
	Rice	1	10.
	Kaffir Corn	1	8.1
	Sunflower Seed	1	6.
	Sorghum Seed	1	13.
Brans, Middlings and Meals.	Bran (wheat)	1	3.8
	Bran (rye)	1	5.
	Bran (oats)	1	4.3
	Middlings (wheat)	1	4.8
	Middlings (oats)	1	4.3
	Middlings (buckwheat)	1	2.1
	Shorts (wheat)	1	4.8
	Oat Hulls (ground)	1	17.
	Corn Meal	1	12.9
	Corn and Cob Meal	1	15.1
	Barley Meal	1	9.3
	Pea Meal	1	3.2
	Linseed Meal	1	1.6
	Cotton Seed Meal	1	1.2
Manufactured Feeds.	Bread (made with water)	1	7.2
	Bread (made with milk)	1	5.6
	Gluten Feed	1	3.3
	Gluten Meal	1	2.1
	Hominy Chop	1	11.2
	Quaker Oats Feed	1	5.4
	Brewer's Grains (dried)	1	2.8
	Brewer's Grains (wet)	1	3.
	Malt Sprouts	1	2.2
Animal Foods.	Animal Meal	1	1.5
	Beef Scraps	1	1.3
	Green Bone	1	2.3
	Dried Blood	9.7	2. Fat
Bulky Vegetable Foods.	Potatoes	1	17.4
	Carrots	1	9.9
	Beets (sugar)	1	6.8
	Mangel Wurzels	1	4.9
	Rutabagas (Swedes)	1	8.5
	Turnips	1	7.7
	Cabbage	1	7.7
	Lettuce	1	3.
	Red Clover	1	6.
	Alfalfa	1	3.6
	Rye Fodder	1	5.7
	Corn Fodder	1	11.5
	Oat Fodder	1	9.1
Dairy Products.	Buttermilk	1	1.8
	Milk	1	1.4
	Skim Milk	1	1.6
	Whey	1	7.4

The Object of Feeding.

The advantages of feeding for a purpose have been set forth. The purpose may be egg production, the fattening of fowls, the raising of chicks, preparation for shows, or any other of the numerous branches of poultry keeping. They all call for different rations, and varying methods of feeding; that is to say, the foods must be fed in different proportions so that each ration will be suited to the object in view. Suppose your stock of grain is composed only of oats, wheat and corn. In one case it may be advisable to use equal parts of each; in another it may be better that the wheat should equal in quantity the other two combined, while in a third case it may be desirable to use more corn or oats. As we have said, the proportion of each to be used is determined by the object in view. The apportionment of these foods is spoken of as balancing the ration. As a matter of fact it would be a difficult undertaking to compose a suitable ration from these grains alone; other foods are necessary to lessen the proportion of carbohydrates and fat, to decrease the proportion of heat and fat forming nutrients and to increase the feather and flesh forming food. By reference to the above table of foods it will be seen that wheat, oats and corn contain respectively 9.9, 6.8 and 12 times more fat makers than flesh makers. The average is 9.6 of fat to 1 of protein and would give us a ration too wide for many purposes. We will first show why the ration should be narrower than this, and then explain how to make it so.

Chickens Need a Narrow Ration.

Chickens need a far narrower ration than do matured fowls—a ration containing considerable animal food, and this is one of the points I wish to impress upon readers. Experience has caused me to realize its importance. In the early days of Buff Plymouth Rocks, their combs were too large, and knowing that meat, even in small quantities, tended to increase the size of the combs, I avoided its use as much as possible. By this course the size of the combs was governed to a certain extent, but what a difference was visible in the growth of the young birds which were supplied with animal food and those which were deprived of it. We all like to experiment, and it took me a few years to find out that not only do chicks need animal food, but they need it in liberal quantities. It has long been demonstrated that some meat is necessary, but in the case of young chicks it is not generally fed in sufficient quantities.

Study nature. Wild birds in feeding their young have preferences, even in the selection of vegetable foods. Some prefer weed seeds, others the young buds of trees; many are partial to fruit and other vegetables, but a very large majority gather in the flies, bugs, beetles and worms that venture within their range, and upon these the young warblers thrive, grow fat and feathers, and are in a very short time in show condition. Have you ever noticed the quills on the nestlings? How fast they grow. Seldom do we see a chick feather so fast. The food that produces feathers rapidly is the best food for chickens, and they should be well supplied with it, at least until they are through their first molt. Such food will be chiefly animal food and will compose a very narrow ration.

It is well known that the yolk of the egg is absorbed by the chick before and after hatching. That is nature's food and must be good. Is it a wide or narrow ration? It is extremely narrow. One part protein to three parts fat is considered very narrow, but this first food of a chicken is even more so. It is composed of one part protein to about two parts fat (15.7:33.3), and please remember it is about one-half water—one-half water. Milk is another natural food of the young, and just as good for chickens as for babes. How is it proportioned—3.3 protein to 4 fat. Add the starchy contents, and approximately it reaches the proportion of 1:2. Quite narrow, is it not? Yet the young live and thrive upon it.

Nature teaches us, therefore, that the food of young chickens should contain about one part protein to two parts carbohydrates and fat. This is from two to three parts narrower than is generally advocated, but it has given better results than any other I have tried and my experiments have been not a few. Then, too, as we have shown nature upholds it.

Do not feed hard boiled eggs in large quantities. Such food may be balanced correctly, but it is indigestible, and

remember that of all foods only the portion digested provides nutriment. If you must feed it, let it be well broken. Let the particles be thoroughly separated by the use of stale bread crumbs, then nearly the whole of it will be digested. It is far better, however, to use uncooked eggs. Mix them with bread crumbs, shorts, cornmeal or all of these, so that the food shall not be sticky or pasty. Use some bran if you choose, but not too much, and if you are tempted to add a little clear sand, don't be timid about it.

As the chicks become older—say from two weeks of age, beef scraps, dried blood, animal meal or finely ground green bone may be used with benefit. These foods contain in large proportion the protein we want, and their use enables the feeder to make a ration suitable for chicks. Without the aid of beef scraps or one of the other animal foods mentioned the eastern duck growers would never have been able to place ducklings upon the market in such desirable condition as they do. Their growth would not be so fast, their flesh would be less tender and the ducklings less plump. This means that demand would decrease and prices would be lower. Just so with young chickens. If intended for market as broilers they must have animal food to hasten growth and keep them in health. The forcing to which they are subject would run them off their legs in a short time if their food consisted exclusively of grain either whole or ground. A most desirable feature of these animal foods is that their protein contents produce flesh without an excess of fat. The breeder of exhibition stock will appreciate the importance of this fact, especially if the cockerels which he has been forcing for early fall shows give signs of leg weakness. The food they have been getting has produced too much fat and not enough muscle and flesh. A change of food—the addition of animal protein to the ration—goes to the root of the trouble and in a short time the birds are again "on their feet."

Animal protein works wonders with fowls, and while it is so plentiful in green bone, dried blood, animal meal and beef scraps, etc., and considering that these foods are so easily obtainable, no breeder of fowls can afford to be without a supply. In animal meal and beef scraps there is nearly as much protein as there is of carbohydrates and fat. In green bone there is about half as much, and in dried blood there is little else than protein.

How chickens delight in a little crisp lettuce, grass or clover. Provide it if possible; otherwise cook some carrots, cabbage, turnips, beets or mangels for them, or let them pick away at a few raw potatoes. Clover is now sold in such convenient forms (both cut and ground) that no breeder should be without it if he has any difficulty in providing green food. Lettuce and clover contain much protein.

Let your chicks have enough food, but do not stuff them. Little chick will begin to cry for you when they discover that you are their attendant and if you are at all soft hearted it will be hard to refuse the continued stuffing they cry for. Feed little and often. Chicks are never so happy as when scratching in shallow litter for little crumbs or seeds. Will they do this if overfed? No. Limit the food and keep them singing, but let them have enough to repay them for their work.

Some breeders keep one variety of food continually before their chicks and a number of them are successful poultry raisers. This seems contradictory following immediately after the suggestion to feed little and often, but it is not so strange as it appears at first glance. If one kind of food is kept continually before them, the chicks partake of it only occasionally as they need it. If they have been fed on the plan first suggested—little and often, it is likely they will gorge themselves when first allowed access to large quantities of food, but if they have been used to it, they simply nibble and run, and although their crops are never empty, neither are they overloaded. If such a method be adopted the food to be kept before them must always be of the same variety. Cracked corn is generally used. A change from corn to wheat would be an inducement to overfeed. It would tempt their appetites and induce them to overload their crops. We do not advocate this method of feeding, but if it is adopted, as it sometimes is for a time-saver, the other food supply should be made up largely of protein.

Balancing the Rations for Chicks.

The reader has now been duly impressed with the value of protein and its use in the ration, and we will give an example of balancing the ration so that anybody with any foods will know how to go about it.

Following along the lines of our argument the ration shall possess about one part protein to two parts carbohydrates and fat, and is intended for newly hatched chicks.

Our first chick food is egg, both white and yolk well beaten. In this the proportion of protein and carbohydrates is about equal.

This we mix with bread so as to render it comparatively dry. We will assume that we have a flock of chicks that require about a pound of dry matter each meal. Dry matter is the total bulk of food less water or moisture. In one pound of eggs, that is in the edible portion, there is twenty-seven per cent of dry matter that is made up of thirteen per cent protein and twelve per cent fat, in addition to ash, etc. In a pound of bread crumbs we find eighty-eight per cent of dry matter made up of eleven per cent protein, seventy-five per cent fat, etc. If we add the total amount of protein and fat contained in the eggs and bread, we find we have twenty-four parts protein and eighty-seven parts fat; that is, about three and a half times as much fat as protein, the actual figures being 3:6. The nutritive ratio of this mixture would be 1:3.6. To make the ration narrower we might reduce the bread crumbs to three-quarters of a pound, but that would make the mixture too "pasty." We will therefore leave it as before and instead of securing the narrower ration by that means we feed in addition a little meat. Take beef scraps for instance. These on an average contain about ninety-three per cent dry matter, of which forty-five per cent is protein and forty-seven per cent is carbohydrates. The protein and carbohydrates being about equal it will need only a little beef scraps to bring the nutritive ration down to 1:2, the ration we have suggested before as being a desirable one for chicks.

After the chickens are one or two weeks old the egg food will become scarcer or perhaps too expensive and it becomes necessary to have a substitute. We wish to make the change of food without making too great a change in the ratio. In looking around for a suitable food we think of cracked wheat. One pound of cracked wheat contains about eighty-nine per cent dry matter, of which .075 is protein and .700 carbohydrates. Once more we take beef scraps to be fed in conjunction with it. We have given the amount of protein and carbohydrates in beef scraps. Now add the total to that contained in wheat and we have .525 protein and 1.170 carbohydrates and fats. Dividing the latter by the former gives us a ratio of 1:2.2.

Finely cracked corn may be substituted for the wheat. In which case the following result would be attained:

	Dry Matter.	Protein.	Carbohydrates.
1 lb. corn	.89	.062	.752
1 lb. beef scraps	.93	.45	.47
		.512	1.222

Nutritive ratio.....1:2.4.

By the time the chickens have been fed this way for another week or two we reduce the proportion of beef scraps to one half, which, in connection with cracked wheat, gives us a nutritive ratio of 1:3.2. This is a very satisfactory ration after the chickens are three weeks old.

As far back as we can remember we have known eggs and bread crumbs to be a first food for cage birds and for chicks, and now having examined the composition of these articles of food, what does it prove? Simply that the "old woman's nonsense" of eggs and bread crumbs is scientifically and naturally correct and that, knowingly or unknowingly, our grandmothers have been following nature's way as closely as possible.

If it is not desirable to go to the trouble of figuring out a ration, the easier way is to choose from the above list such a variety of foods as will give a ration near enough for general purposes. It should be remembered that the larger the proportion of carbohydrates and fat, the wider the ration. If you wish to make the ration narrower take a food that possesses little carbohydrates and fat; bran for instance, is one of the best of foods. In this connection we must warn the reader to use very little, if any, cottonseed meal. We have before informed readers that it is very indigestible. Linseed meal is more easily digested, but it, too, should be used sparingly.

Remember to give the chickens all the green food they need. There is nothing better for them than clover, lettuce or cabbage.

To enable readers to figure out a balanced ration we will present a table showing the quantities of dry matter and the proportion of protein, carbohydrates and fat contained in poultry foods in every day use.

Forcing Late Hatched Chicks for Show.

Both the fancier and the breeder of poultry for market are well on the way to successful feeding when they have realized that different foods produce different conditions and have decided to select such foods as will aid them in securing the condition desired. It is clear that a change of food is necessary when the chick merges from its babyhood, takes on a new suit of feathers and becomes a full-fledged youngster. Every poultryman we believe sees the necessity for a change of food at that period, but the majority are governed simply by the knowledge that the chicken is then equipped with better means of digestion and can do with less costly and more bulky food. True it is that in most cases the breeder desires rapid growth and generally provides, or at least intends to provide, that which will induce it. Is it not in addition necessary to consider what requirement the fowl is intended to fulfill? Take the exhibitor, for instance. His fowls are destined for the show room, yet this does not mean that they shall all be fed alike or in equal quantities. Some must be prepared for the early fall and winter shows; others for the later winter shows. If the exhibitor is blessed with incubators to hatch early chicks, brooders to accommodate them, and experience that enables him to carry them healthily through the early spring when conditions are unnatural, then indeed he will feed his fall exhibits as he will his later show birds, because there is little or no necessity for forcing them; but if his chicks are late hatched, he must adopt heroic measures to "bring them along" if he would gain a place among the successful exhibitors. These late hatched, forced youngsters seldom attain the size of those which are fed for growth and vigor and allowed to develop size before putting on the gloss and finish for the show room.

A Flock of Growthy Youngsters on the Verge of Maturity—Bred by Mr. J. W. Shaw.

What method of feeding is practiced to hurry these young candidates along?

A ration composed of animal matter supplemented by fat forming foods; and during the closing stage the addition of foods known to contain considerable oil. The first is intended to hasten maturity; the second to put on weight, and the third to put on the finishing touches—the gloss to the feathers. Bulky vegetable food is added to keep the digestive organs in good working order, and frequently condiments are given to coax the fowl to eat more and more of the concentrated food. Frequent change of food is necessary so that the fowl shall not go "off its feed." Few foods are too expensive to be procured at this season, for winning in the fall means sales for the winter shows.

In the days when the writer was exhibiting—where the winters stole well into the spring and the big fall show seemed to advance to meet the summer—the principal event being held in August—many were the rations tried, and

feeding sometimes extended well into the evening hours. "Little and often" was found to be a good motto, and only at the last meal (about 9 p. m.) were the fowls coaxed to eat more than they wanted, then they got the tempting tit-bits which had been saved for the last moment—scraps of meat, green cut bone, bits of bread, oatmeal porridge (well sugared), cooked rice, cooked potatoes—fed by lamplight.

Result: Winners at the fall show; culls later on.

These fowls were not allowed extensive range. They were confined in yards about eight by fifty feet, in flocks of eight or ten. Their roosting pens were kept scrupulously clean; wooden floors well sprinkled with sand every week, and droppings raked every day. They were confined to the house during inclement weather. Tame? Sure! A little training in good sized coops built upon the walls above the roosts—handling every day—induced a confidence in their attendants that made all the difference during show week.

The daily food during these forcing days consisted of mash early in the morning (a small amount), wheat, oats or barley in litter at about ten a. m. and two p. m. and corn at six p. m. Sunflower seeds were frequently given in place of the barley, wheat or oats, and during the two weeks preceding the show, hemp seed was provided, or linseed meal mixed with the mash. Cabbage was hung in the pens continually; grit of course always before them—sometimes put in their mash; and they had all the milk they could drink.

It's lots of trouble to make winners out of late hatched birds and it needs lots of observation to keep them in health.

Ration for Growthy Youngsters.

Early hatched birds on the other hand cause little worry, little trouble, and it is a pleasure to see them grow.

An extensive run where shade is available is desirable. A grass run, an alfalfa patch, a clover or cornfield are alike ideal poultry runs and provide an abundance of insects that coax the rangy youngsters to exercise while furnishing them with a substitute for meat. Chickens from two to five months old gain size and health under such conditions. If they are on a farm where range is unlimited they need only a little additional food morning and evening, the variety depending upon what the fields afford. Where the range is less extensive it provides fewer insects and little or no grain.

We will assume that green food is plentiful.

Of what then shall the ration consist? Such foods as promote the formation of muscle and bone,—that means size; flesh and fat—that means vigor.

What shall the foundation of the ration be? Oats.

"But oats are so seldom fed" you say, "particularly in sections where corn is plentifully grown."

Where oats have been tried they are seldom discarded. They are the best grain I know to put size on a fowl, and they have formed the foundation of my ration for growing stock for many years.

To form feathers which are continually being renewed in fowls of this age we require more animal matter than can be secured on the range. It is better to give more rather than less at such a stage and a ration of about one part protein to four parts carbohydrates is none too narrow. It may be composed of the following each day: One feed of oats, one feed of wheat and one of meat or cut bone and corn. For the purpose of forming the ration we will take one pound of each with exception of meat and corn, of which we give half pound each. More or less than these quantities may be used, depending upon the number of fowls to be fed, but the proportion will be the same.

Upon examination of the list of foods given herewith we find that in a pound of oats there is .092 protein and .532 carbohydrates and fat; in a pound of wheat .075 and .700 respectively; in a half pound of corn .035 and .392, and in a half pound of beef scraps .225 and .235 respectively. To illustrate, we will add these quantities:

	Protein.	Carbohydrates and Fat.
One pound oats	.092	.532
One pound wheat	.075	.700
One-half pound corn	.035	.392
One-half pound beefscraps	.225	.235
	.427	1.859

Upon dividing the carbohydrates and fat by the protein we find the proportion of these important constituents to be one part protein to 4.35 parts carbohydrates and fat. This is a little wider than we intended, but it is near enough for all practical purposes, even if we did not consider the green food and insects secured in the run during the day. The addition of these will bring the ration down to the desired point.

The foods composing the ration will be changed frequently with the exception of the oats. We will use oats every day. Sometimes we may substitute buck wheat for wheat or corn, at other times barley, etc., etc. Occasionally we may feed a mash in which we use considerable bran. This will assist in keeping the daily ration narrow even though we may feel it wise to give a feed of peas or barley or an extra supply of corn (these containing large proportions of carbohydrates and fat.)

With the example and analysis of foods here given there will be no difficulty forming a ration from such foods as are plentiful. Prices vary, as we have said, and the variation should be accepted as a hint to change the food. The fowls will not object.

During the month immediately preceeding a show the birds may be fed as suggested for the earlier hatched chickens, but unless they are under weight there will be no necessity for feeding them after the usual evening meal, which is given before sundown.

Having considered the composition of foods in a general way we may go into details. We are enabled to present analyses of foods that have been made by experiment stations throughout the country. First it must be understood that analyses differ slightly because the foods analyzed differ in composition. It would be extremely difficult to procure two samples of wheat that contain exactly equal proportions of protein, carbohydrates and fat; similarly with regard to other vegetable formation. This applies also to animal matter. The quantities given therefore are usually average quantities, yet are sufficiently exact for practical purposes.

Proportion of Protein and Carbohydrates and Fat in Foods Used by Poultrymen.

(Parentheses are used where the digestibility is estimated from that of other similar feeding stuffs.)	Digestible Matter in One Pound. Total Dry Matter in lb.	Protein.	Carbohydrates & Fat.	Total.	Nutritive Ratio.
GRAINS:					
Wheat	.896	(.075)	(.700)	.775	(1:9.3)
Corn	.912	.070	.784	.854	1:11.2
Oats	.890	.092	.532	.624	1:5.8
Barley	.891	.087	.962	.779	1:8 0
Buckwheat	.874	(.078)	(.548)	(.626)	(1:7.0)
Rye	.884	(.064)	(.703)	(.767)	(1:11.0)
Peas	.856	.188	.535	.723	1:2 8
Sorghum Seed	.873	(.054)	(.668)	(.722)	(1:13.3)
BRANS, MIDDLINGS AND MEALS.					
Bran (wheat.)	.881	.120	.454	.574	1:3.8
Bran (rye.)	.884	(.115)	(.488)	(.603)	(1:4-2)
Middlings (wheat.)	.879	.128	.609	.737	1:4 8
Middlings (buckwheat.)	.868	(.237)	(.505)	(.742)	(1:2.1)
Shorts (wheat.)	.892	.122	.586	.708	1:4 8
Corn Meal	.850	.055	.711	.766	1:12.9
Corn and Cob Meal	.849	.044	.665	.709	1:15.1
Barley Meal	.881	.074	.668	.762	1:9.3
Pea Meal	.895	.168	.531	.699	1:3.2
Linseed Meal	.899	.289	.449	.738	1:1.6
Cotton Seed Meal	.918	.372	.437	.809	1:1.2
MANUFACTURED FEEDS.					
Gluten Feed	.917	.194	.633	.827	1:3.3
Gluten Meal	.922	.323	.725	1.048	1:2 2
Hominy Chop	.889	(.071)	(.795)	(.866)	(1:11.2)
Brewers' Grains (dried)	.917	.168	.471	.639	1:2.8
Brewers' Grains (wet)	.243	.043	.128	.171	1:3.0
Malt Sprouts	.898	.186	.403	.589	1:2.2
BULKY VEGETABLE FOODS.					
Potatoes	.211	009	.157	.166	1:17.4
Carrots	.114	(.009)	(.089)	(.098)	1:9.9
Beets (Sugar)	.135	.016	.109	.125	1:6.8
Mangel-Wurzels	.091	.011	.054	.065	1:4.9
Rutabagas	.114	.010	.085	.095	1:8.5
Turnips	.095	.010	.077	.087	1:7.7
Red Clover	.280	(.028)	(.153)	(.181)	(1:5.5)
Alfalfa	.916	.104	.430	.534	1:4.1
DAIRY PRODUCTS.					
Buttermilk	.082	.028	.050	.078	1:1.8
Milk	.127	.031	.137	.168	1:4.4
Skim Milk	.095	.035	.057	.092	1:1.6
Whey	.070	.008	.059	.067	1:7.4

PEKIN DUCKS FOR PROFIT.

Wonderful Increase in the Business—Poultry Raising is Now a Trade—Operating Duck Egg Incubators—Proper Care of Breeding Stock—It Does Not Pay to Cross Pekins—Formula for Feeding Laying Ducks and Young Ducks.

BY JAMES RANKIN, BREEDER.

THE wonderful growth and increase of the duck business in this country during the past twenty years has been phenomenal, and though it has been multiplied many times over (and never more so than during the last five years) yet the demand exceeds the supply. Though the prices for dressed birds the past season have ruled a trifle lower, which was the case with all kinds of poultry, the unusually low price of grain has more than made up the deficiency.

We will briefly describe our method of growing and marketing Pekin ducks. Though we have grown ducks more or less all our lives, principally for our own use, we started in some twenty-four years ago with thirty Pekin ducks to make it a business. From those thirty birds we grew more than fifteen hundred young birds for market, and we distinctly recollect the job we had in getting rid of them. The marketmen would look at us in surprise, and say: "There is no call for that stuff. We do not want it." Now, though growing ten times as many, we can not fill our orders from these same men, and it is not alone what we grow, but the hundreds of thousands of birds that are grown by others all over the country.

View of West Side of Lane, Rankin's Duck Ranch.

Our methods at first were crude, and we met with some losses. It was weak legs, sore eyes, hump backs and other troubles, the cause and remedy for which we finally discovered. Too highly concentrated food, together with too little animal food, without the proper amount and quality of grit to enable the young birds to grind and assimilate it, accounted for a large share of all these troubles, and are responsible now for nearly all the letters with which we have been flooded the past season, all containing the same refrain: "My ducklings are weak-legged; many of them can not stand, and are dying. They have dysentery, sore eyes and abnormal livers. What shall I do?"

Poultry Raising is Now a Trade.

It is well known by this time that the poultry business is as much a trade as any other department in life, and a man in order to succeed must possess, at least, two traits to qualify him for the business—intelligence and energy. His buildings should be neat and commodious, constructed with a view of reducing the labor to a minimum, also of securing good drainage. Above all start in with good incubators and good brooding apparatus. Secure first-class stock to start with. Debilitated, degenerate stock will never produce healthy young birds, and it is worse than useless to hatch thousands of young birds that come into the world with enfeebled constitutions and in no condition to live. But there are other sources of mortality aside from this. Cheap and improperly constructed incubators, with greatly varying temperature in their egg chambers, defective brooders, which mean extremes of heat and cold for the young birds—all contribute their share towards the death rate.

I have never thought that the variety of food given was as responsible for the poultry growers' troubles as the care, cleanliness and proper control of heat in both hatching and brooding the young birds. It is true that under proper regimen and diet, young birds will grow faster, develop better and weigh more at a marketable age than if the food ingredients were not right, and the old birds will also contribute a larger number of highly fertilized eggs when the food conditions are right. Our food formula for ducklings in different stages of growth, also for laying and store birds, I will give later on, and confine myself now to the care and treatment of the birds.

Operating Duck Egg Incubators.

Highly fertilized eggs should be used, if possible, as it will mean strong ducklings and more of them. See that the heat in the egg chamber is uniform. Use accurate glasses, and place them on the eggs in the center of the egg chamber. Run them at 102 degrees the first two weeks and 103 after the animal heat begins to rise. The eggs should be cooled a little once each day after the first week, and

longer after the animal heat rises. A little moisture should be used after the eighteenth day, ventilating a little more towards the end of the hatch. Observing these rules, with a good machine and good eggs, the operator should hatch from 65 to 70 per cent of all the eggs used.

Do not feed your ducklings till after they are thirty-six hours old. Feed four times a day and no more at a time than they will eat clean, in fact, keep them a little short, especially during confinement in inclement weather, as it is an incentive to exercise, which they need in order to assimilate their food. Do not put more than one hundred in a pen; seventy-five would be better. Bed the little fellows, until ten days old, with hay chaff or cut straw, then with sawdust (if to be had), as the latter is both a good absorbent and disinfectant. Keep the pens dry and clean, both outside and in. The welfare of the ducklings depends upon this. Be sure to give shade in warm weather. It is not necessary to keep water by them, but give all they will drink, while feeding. The birds should be ready for market at ten weeks old. Breeding birds should be selected from the early hatched birds (I always select the largest and choicest), handling every one carefully. It is true that the early hatched birds are worth more in market, but I must keep them to breed from, as they will develop into larger and better birds than those hatched later, as the cool, temperate weather of the early spring will facilitate their growth and maturity much better than the extreme heat of mid-summer. The birds cost me more, but it is policy in the end, as they reproduce much sooner than the later ones.

Proper Care of Breeding Stock.

The birds selected for breeding should be turned out to pasture or in large grassy lots, if possible, and fed on adulterated food. By this I mean bran, Quaker oat feed, with a little meal and grit. About November first these birds should be yarded for winter work. The yards should have been previously prepared for their reception. About August first, after the old birds are through laying and beginning to molt, they should be taken out of the yards and turned out to pasture. The yards are turned and sowed to barley, which crop serves a double purpose—that of disinfecting the ground and giving a heavy crop of green food for the birds. This green food is cut fine and mixed in their daily rations. When the time comes to yard the birds, this crop has all been cut and the yards are in fine condition for them. These yards are one hundred feet long and the same width as the pens in the building. Whenever we have room, the yards are run out fan-shaped, which of course makes them larger. Our green food now consists of green rye, obtained in the way described. As fast as our yards are emptied of ducklings, they are turned and sowed quickly to rye, as this is a crop which resists winter's frosts. We now have about two acres of this rye, a perfect mass of green, about eighteen inches high. This largely constitutes our green food for winter. Just before a snow storm we cut large quantities of it and pile it up in a frozen state in some shady place, where it can be drawn upon at will.

Should this supply be exhausted while the ground is covered with snow, we always have several tons of fine clover rowen, cured for the purpose. This, with a few hundred head of refuse cabbage, carries us through in good shape. I dwell particularly on this green food, because it is one of the necessities for the production of strong highly fertilized eggs. Every one knows how necessary green food is for hens during winter confinement, yet it is even more essential for ducks. I now mix 15 per cent of this green rye, cut fine, with other food.

It Does Not Pay to Cross Pekins.

I am often asked if crossing the Pekin with other birds will not produce a better market bird than the thoroughbreds. In reply, will say, that I have crossed the Pekin in every conceivable way with other breeds, with an eye to securing a better market bird, but with unsatisfactory results. The birds either came out with weakened constitutions, were longer maturing and had dark pin feathers or unsightly blotches on the skin. This experience has more than ever convinced me that there is nothing, as yet, in the shape of a duck that will supercede the Pekin as a market bird. There is no bird that is under better control or that will respond sooner to generous food and care than the Pekin duck. Her fecundity is wonderful. Not even the far-famed Minorca or Leghorn can compete with her as an egg producer. Beginning, if you wish, at four and one-half months old, she will contribute her quota of one egg per day, with but little intermission, for nearly ten months, and as an egg-producer for market alone she is more profitable than the hen. There is not a day in the year that we are without duck eggs. When the old birds begin to molt and are barren, the younger ones commence their work. I will now give my methods and formulas for feeding the young birds (at different stages of growth) for eggs, also for breeding birds.

Formulas for Feeding Ducks.

For Breeding Birds (Old and Young During the Fall).—Feed three parts wheat bran, one part Quaker oat food, or oatmeal, ground oats or other substitute, one part cornmeal, five per cent of beef scraps, five per cent of grit, and all the green food they will eat, in the shape of corn fodder (cut fine), clover, or oat fodder. Feed this mixture twice a day, all they will eat.

For Laying Birds.—Equal parts of wheat bran and cornmeal, twenty per cent of Quaker oat food, ten per cent of boiled turnips or potatoes, fifteen per cent of clover rowen, green rye or refuse cabbage, chopped fine, five per cent of grit. Feed twice a day all they will eat, with a lunch of corn and oats at noon. Keep grit and oyster shells constantly by them.

For Feeding at Different Stages of Growth.—The first four days feed equal parts of rolled oats and cracker or bread crumbs, ten per cent of hard boiled eggs, chopped fine, five per cent coarse sand. Feed four times a day what they will eat clean. Brooder heat, ninety degrees.

When from four days to three weeks old, feed equal parts of rolled oats and wheat bran, ten per cent cornmeal, five per cent coarse sand, five per cent of fine ground beef, cornmeal, wheat bran and Quaker oat food, five per cent of scraps soaked, finely cut clover hay, rye or cabbage. Feed four times a day. Brooder heat from eighty-five to seventy-five degrees. When from three to six weeks old, feed equal parts of fine grit, five per cent of beef scraps. Mix in green food. Feed four times a day.

When from six to eight weeks old, feed three parts cornmeal, two parts wheat bran, one part Quaker oat food, ten per cent of beef scraps, five per cent of grit. Feed three times a day.

When from eight to ten weeks old, feed two-thirds cornmeal, one-third equal parts of wheat bran and oat food, ten per cent of beef scraps, five per cent of grit, oyster shells and less green food. Feed three times a day. They should now be ready for market.

We never cook the food for our ducks after they are a week old, but mix it with cold water.

I wish to emphasize several points again. Do not forget the grit; it is absolutely essential. Never feed more than a little bird will eat clean. Keep them a little hungry. See that pens and yards are sweet and clean, for though ducklings may stand more neglect than chicks, remember that they will not thrive in filth. If anyone fails in this business, it must be through his own incompetency and neglect.

With us, it is the surest crop we can grow. Independent of the elements, affected neither by floods nor drouths, heat nor cold, a concentrated cash product turned every three month, it makes the best returns of any crop on the farm.

FIVE THOUSAND DUCKS ON TWO ACRES.

That is the Number Mr. George H. Pollard Produced on that Amount of Ground in one Season—What the Editor of Reliable Poultry Journal Saw and Was told on a Visit to the Pollard Poultry Farm—What Mr. Pollard Feeds and How He Feeds It.

TO SUCCESSFULLY produce 5,000 ducks on less than two acres of ground is proof enough that Mr. George H. Pollard, proprietor of the Pollard Poultry Farm, is up and coming. This is precisely what he did with the assistance of two helpers, and he did it smilingly. He has that way about him. Blessed with good health, and understanding fully that if Pollard does not help himself, no one else will do it for him, he keeps up with the work. He is careful not to bite off more than he can chew.

Said Mr. Pollard: "I am satisfied that as high as 8,000 ducks can be raised for market, in one season, on two acres of ground". It should be remembered that "ducks for market" means that they are shipped away when ten weeks old. Mr. Pollard has been in the duck raising branch of the poultry business only six years. He bought the two-acre plant of an enthusiast who put over $5,000 into it and sold out to Mr. Pollard after a two years' trial at it, "on account of his health." Said Mr. Pollard with some emphasis: "I soon found out what ailed his health."

After getting posession it took Mr. Pollard two years to find out what had hit him. He very soon discovered that life on a duck ranch, for a green hand, was not what it is sometimes cracked up to be. He found the breeding stock run down in vigor and given to sickness. Those first two years rounded up a costly experience, but the third year found him well on his feet, with new blood, strong stock "and the kick in the eggs."

The floors of Mr. Pollard's brooding house are of cement and ratproof, unless a rat or mole gets under the cement; then there is trouble, resulting sometimes in an undermining of the floor, letting it down. All necessary precaution should be taken against rats. A cement floor is not essential in a brooding house. A dirt floor, if kept clean, will answer, but several inches of earth should be removed, a ratproof wire cloth be put down, covering the entire space between the ground sills of the house and turned up and nailed securely to the sills; after which the earth should be replaced. If well done this plan gives us a ratproof brooding house, and enables the anxious owner of the broods to enjoy "nature's sweet restorer." It should be stated that a cement floor is easier to keep clean than a dirt floor. Mr. Pollard has a water fountain set in every second partition, and two pens are thus watered out of one dish.

Hatching, Raising and Marketing.

Last spring Mr. Pollard had 185 laying ducks and succeeded in producing nearly 5,000 ducklings. He uses hot water incubators (300 and 600-egg size machines), and when eggs will hatch well at all, he has good hatches in his incubators. Said he: "I tell you the kick must be in the eggs, and to get it in the eggs the kick must be in the breeding stock. Sometimes, at certain seasons of the year, I can not get good hatches, no matter how hard I try or what I do. They wouldn't hatch right if I sat on top of the machines twenty-four hours out of every day! At another time I will be busy at this, that and the other thing, and often neglect the incubators, but they hatch just the same, turning out the ducks or chicks in great shape. It is then that the breeding stock is in fine condition. Everything in nature is favorable. The kick is now in the stock and in the eggs! Then I'm glad to be here. Our stock that gives us the eggs must not be allowed to deteriorate, or get out of condition. If they do, we are up a stump till we get back to solid ground."

Mr. Pollard's incubators are located in a furnace-heated house cellar. The place is clean and dry, and maintains a uniform temperature. "This season," continued he, "we did not quite average one duck to two eggs set. We hatched a little less than 50 per cent of the total number of eggs placed in the machines, and this excludes the first two machinefuls and the last two. The average I am giving you is for the hatching season. As regards the rate of mortality after they are hatched, we have lost 5 to 6 per cent this year, but last year we had remarkably good success, raising 97 per cent of the total number hatched."

We are glad to be able to present herewith a valuable article written by Mr. Pollard himself, telling what he feeds his ducks and how he feeds them. The ducks themselves, as we saw them, are complete proof that his way is a good way. On August 25, the date of our visit, Mr. Pollard was killing and dressing several barrelfuls of eleven-weeks-old ducklings. One pair of them, dressed weighed fifteen and a quarter pound. At Providence, last year, he exhibited a pair of twelve-weeks-old ducklings that weighed, dressed, a fraction over eighteen pounds. Such weights tell the story of whether or not his method of feeding does the business.

Ducks from the Pollard farm are sold in Pawtucket, Providence and Boston. Mr. Pollard learned much about the practical side of poultry, and how to market fowls and eggs during the twelve years that he spent driving a wagon and buying up produce of this kind to resell. He bought in this way through the country and sold to retail dealers in Pawtucket and Providence; also to private customers. It was, no doubt, in this business that he got the training that has enabled him to succeed so well in raising poultry. He learned in that business not to expect too much, not to be easily discouraged, not to figure his profits in dollars or tens of dollars, but to keep up a constant watchfulness to earn and save the nickels and dimes!

While on the wagon Mr. Pollard learned, for instance, that Plymouth Rocks and Wyandottes, on account of their appearance when dressed, sell on sight at paying prices, where unsightly stock (mongrels) can be sold only at low prices and with difficulty. He learned that it is a matter of importance to have stock that is offered for sale in the most attractive and appetizing shape possible; so he breeds such fowls as can be made most presentable, then spares no pains to have them pleasing to the eye. Besides the Imperial Pekin duck, he now breeds in their purity White Plymouth Rocks and White Wyandottes.

But to return to the ducks. All ducklings sold from this farm are dry-picked. "They keep better, keep their color better and look better on sale," explained Mr. Pollard. These

ducks are hung up by the feet, a sharp knife is inserted in the roof of the mouth, pushed backward into the brain and given a side cut that severs a large artery. They soon bleed to death and the end is said to be painless. The feathers are jerked off dry while the body is yet warm. The picker pulls the feathers off very rapidly as long as he can get a fair hold of them; then he wets his hand in cold water, wets the down and small feathers, rolls these up in wads by a twist of the wrist and thus gets a better hold on them and hastens matters. An average fast picker can pick forty to fifty a day, and the standard price for picking is six cents per duck. On Long Island it is five cents per duck.

Private Trade Pays Best.

So far as he can Mr. Pollard works up a private trade. Last season he sold all of his first lot of ducklings at fifty cents per pound. This year he sold a few of his earliest hatched at sixty cents per pound. The first shipment he made to market this year brought him thirty-five cents per pound. These were hatched March 2d, and marketed the last of April. At eight weeks old they averaged ten and one-half pounds per pair. He has had lot after lot average eleven and one-half pounds per pair, "but," said he, "these are what I call my good luck flocks." The day before we were there, Mr. Pollard shipped twenty-five ducklings that weighed, dressed, 153 pounds, net weight. They were nine weeks and two days old.

A large number of the best young ducks are saved out each year as breeders for home use and for sale. We saw a flock of 105 of these that one of Mr. Pollard's helpers had bought at $1.50 per head—a young man who has learned the trade and is going into business for himself. The ducks in this flock averaged seven pounds each, the drakes eight and one-half to nine pounds each.—From Reliable Poultry Journal.

CARE AND MANAGEMENT OF TURKEYS.

From Shell to Market—Care of Adults—Setting the Hens—Care of Poults—Feeding for Market—Preparing Fine Specimens for Exhibition.

BY MRS. S. N. KING, BREEDER.

THE first and great requisite to successful poultry raising is strong, vigorous stock. Whatever variety may be selected, be sure that your birds have not been weakened by disease nor by repeated inbreeding. Many persons engaged in this business select their best stock, male and female, year after year, and after a few years of this close inbreeding find their flock deteriorated in stamina, and with slight powers of resistance against the encroachments of disease. Their birds may be beautiful as the type is more easily fixed by use of the same family, but the chances are against a large per cent of the poults hatched reaching maturity.

On the other hand, a change of family or infusion of new blood every year is not necessary. If you have a male bird that is satisfactory, it is quite safe and desirable to use him two years, keeping the finest of the pullets, but avoid using a young tom and pullets of the same flock. Always breed in line of descent.

In selecting stock do it with a view to shape and color, rather than weight. My experience has proved to me that abnormally large birds are very unprofitable and disappointing, except for show birds. A young tom weighing from twenty-five to thirty pounds and an adult weighing from thirty-six to forty are as large as can be used without danger of injury to the hens. Young hens weighing fifteen to eighteen pounds and adults eighteen to twenty are more prolific and better mothers than those attaining a much greater size. Hens weighing twenty-five pounds are not reliable for a full clutch of eggs. They usually lay a few at irregular intervals and in different places, as though it were a matter of unconcern to them whether their eggs were cared for or not. These eggs are frequently soft-shelled and infertile, so that they can not be depended on to add greatly to one's flock.

One tom and ten females is a good number for a flock, but if it is desirable to keep a greater number of females, two toms can be used, keeping one in a small yard each alternate day, letting the hens have their liberty, as they need the range and variety of food which they obtain in that way, and which they would not eat if it were given to them in a yard.

Turkeys Require Range.

Turkeys are impatient of restraint and will neither eat nor lay well when deprived of liberty. One spring we built an "ideal" turkey yard and I fondly hoped that the precious hours spent in watching the turkeys to their nests could be used to better advantage in other ways. We have a grove of maple trees in our chicken yard—planted many years ago, to afford shelter for my chickens. The rows of trees are twelve feet apart and we enclosed a space between two rows with a base board and six-foot wire netting. This we covered with two widths of the netting, fastening the edge of the side netting and securing the middle by guy ropes or wires attached to the branches of trees. At one end we had a door, also covered with netting, so that it was as nearly as possible "out of doors." We placed barrels on their sides, half filled with straw, putting an egg in each, and it was so delightfully "inviting" that I felt quite sure my turkeys would feel at home immediately, but it was a vain expectation. Every morning they walked into their new park as if they thoroughly enjoyed it and seemed content till 3 or 4 o'clock, when they would gather around the door wishing to come out, but lay in those ready-made nests they would not, except, perhaps, three or four, that laid an egg apiece. I finally learned that they had nests of their own, selected under brush piles and among corn fodder, and as soon as they were released they went to them, so I abandoned the plan that seemed so feasible and found that a boy with sharp eyes, in anticipation of a coin for every turkey nest found, was more satisfactory and practicable than my fine new "summer house," and thus we learn by our mistakes, though they are often humilating and not always stepping stones to better things.

I find that very early laying in this latitude [40 degrees north] is not to be desired, as many of the eggs are liable to be chilled and poults can not be hatched to advantage before the 10th of May. Sometimes we have a cold, rainy season even later than that and little turkeys seldom live through a protracted, cold storm. I think the hens are less apt to lay early if the quantity of feed is lessened as the severity of winter decreases.

Another objection to very early laying is that it induces late laying as well and a hen will frequently leave her brood when partly grown in order to raise a second family, which is fatal, to the interest of both, as the first poults need a leader and protector until nearly full grown and the last are too small to endure the cold weather. In her native state the turkey hen does not lay till spring is assured and never deserts her progeny; so with our cultivation and civilization we sometimes get too far away from mother nature. If your hens are to act as brooders never clip their wings. They will need them in protecting their young from rain and dew.

There is great diversity of opinion as to the best way to raise young turkeys, but after an experience of twenty years I am unqualifiedly in favor of the turkey hen as a mother.

Where Turkeys Will Sit.

It is generally supposed that turkeys must sit where they have selected a nest in which to deposit their eggs, but as they frequently choose a place wholly unsuited to the purpose of incubation, either on account of location or because other hens lay in the same nest, it is often desirable to move them to other quarters. A few years ago I attempted to have them sit in barrels (laid on their sides near a fence) when their own selection was objectionable, but utterly failed to induce them to return to their barrels after leaving them for feed and water, although they would remain contentedly enough until hunger again sent them forth. Last summer seven or eight of my hens found a large brush pile wonderfully well suited to them, but as it afforded scant protection from the sun or rain, I was obliged to change their location as each was ready to sit, and I experienced as little trouble as I do in moving my domestic hens to the "hatching house."

Fortunately we had an unused barn without partitions and with an earth floor, which was readily converted into a "turkey house." In one of the corners of this barn was placed a barrel, on its side, in which was plenty of cut straw and a nest-egg. Over the opening I hung a blanket, and at dark had the broody turkey brought to the nest. After dusting her thoroughly with insect powder she was carefully put into the barrel, and as soon as she became quiet the blanket was removed. In the meantime the true nest was made in a large and rather shallow box (I used soap boxes), with the date on which the eggs were due to hatch marked with crayon in large figures, so that they need not be unnecessarily disturbed. When the hen came out of the barrel, which was usually the next morning, she soon found the nest full of eggs, which she at once appropriated. The barrel served as a "trap" for the whole season, as only one or two hens had nests outside that were in safe and comfortable places. Sometimes there were nests all around the room, but I had no trouble about their crowding each other on the nests or trying to exchange. It was necessary to keep feed, fresh water and grit constantly supplied, but although the ground was spaded up for them there was no evidence of their taking a "dust bath," as they do when sitting out. This made it necessary to use insect powder plentifully. As it was difficult to remove them from the nests without endangering the eggs, I sprinkled it liberally on and around the eggs whenever I found a hen off her nest. I also dusted the hens as they were sitting. Each time that I set a turkey I also put turkey eggs under a domestic hen and gave all the poults to the turkey. I find twenty-five a good number for a turkey hen, as she can keep them dry, when a larger number would be more or less exposed to dampness in case of rain or heavy dew. Before giving the poults to the mother, it is well to dust her thoroughly along the back and on the outside of the wings, but not on the inside, as the powder is too strong to be inhaled by the newly hatched poults. It seems to me the most important thing in the care of young turkeys is to put them at once on grass, and for that reason very early hatching is not desirable.

When I began raising them I was advised to give each poult a grain or berry of black pepper as its first meal to insure its future welfare, but it seemed so unnatural that I declined to follow that instruction. Since then as I have watched them, when less than forty-eight hours old, carefully selecting the seed pods from "pepper grass," in preference to blue grass or any other green food, I have wondered if there was not a good reason for what seemed to me only a "notion." For many years I have selected a sunny spot and had a triangular yard made (by using three wide boards in which to keep the flock for a few days, or until the poults were strong enough to run well, but this was not satisfactory. The grass soon lost its freshness and the mother would almost invariably refuse to go under the shelter provided for her. In case of rain her feathers would be wet and the little ones would become draggled, a condition fatal to young poults. Of late years I have found it much more satisfactory to provide a large coop in which the mother can walk about comfortably and give the little ones free range. For this purpose I selected a spot under a large tree where there will be partial protection from sun and rain. It is surprising to see how soon the poults wander some distance from the coop in search of food, always, however, remaining within call of the mother's voice and quickly responding to her warning of danger. When she gives this peculiar note every poult will drop where it is and remain until released by her assurance of safety.

The first food for poults, which should not be given until they are twenty-four hours old, has been a matter of considerable experiment with me, but I have no success in feeding hard boiled eggs, though highly recommended by many. I have tried them for both chicks and poults but always with unsatisfactory results. I have found that the best feed for two or three weeks is stale bread soaked in sweet milk and then squeezed dry, alternating with curd or cheese made from sour milk.

To the cheese, which should not be cooked hard, but should be well drained, I add salt and a little black pepper. It is well to give occasionally a little coarse corn meal slightly dampened, and onion tops and dandeloin stems or pepper grass cut fine, but never give sloppy food. After two or three weeks I add well-boiled wheat to the cheese, but great care should be taken that it is not allowed to sour, which it does quickly in very warm weather. I place the moist food on a clean board and from the first I frequently scatter a spoonful of rolled oats near the coop for them to find. Water should be given in shallow dishes, and it is a good plan to lay a float or board in the dishes two inches smaller in diameter than the top of the dish, to prevent the poults standing in the water. The mother should be supplied with water, corn, wheat and grit, and the coop should be moved every day to fresh, clean sod. The danger just at this point is from indigestion, since poults are voracious eaters, and here on the prairie we have no natural grit. This danger can now be reduced to a minimum, since grit is manufactured in sizes suitable for poults and chicks as well as adult fowls. Fowls eat it greedily, proving that nature is ever true to her wants. Probably indigestion and lice cause a

greater mortality among turkeys, old and young, than all other causes combined. Perhaps in places where the soil is sandy or gravelly the former trouble would not be so serious, but here where some sharp, grinding power has to be provided for them, they often suffer for lack of it.

I always keep a pile of sand and gravel in my chicken yard, but it is surprising how soon the little pebbles disappear, leaving a smooth surface of sand. Great care should be taken not to feed young turkeys too much at a time. This is the rock on which the frail bark of thousands of poults has struck and gone down together with the hopes and plans of their zealous but misguided owners. The natural habit of turkeys is to hunt for food and this they do slowly and deliberately all day long, thus the process of eating and digesting is simultaneous, but when fed abundantly they gorge themselves and in a few weeks fall a prey to their own greed.

Keep Mother Turkey Confined First Week.

With very early hatched turkeys it is better to keep the mother confined in a large coop for several weeks, but when the weather is warm and dry she can be liberated at the end of a week. Never, save once, have I known her to return to the coop at night; neither do they seek the shelter of bushes or boards where enemies might lurk. They usually select an open spot for the night where they can see the approach of foes. Although this situation is exposed to dew and rain they can be depended on to sit close and keep their young warm and dry unless the storm is prolonged until hunger compels them to move.

Notwithstanding the natural timidity of the turkey she shows a courage in the care of her young that I have never seen equalled in other flocks. I have raised poults with domestic hens with no loss, and, with encouraging prospects until they were weaned, when they lost courage, and, refusing to eat, wandered around in search of a mother or kept up an incessant "cheep," "cheep," that was pitiful to hear. At night they sought the company of some friendly hen and tried to slip under her wings, but in the morning they would renew their search for a mother until finally worn out with hunger and loneliness they nearly all died. At other times they adapt themselves more readily to changed conditions, showing that the difference was mainly with the mothers, those being the most desirable that encourage their poults to scatter out and forage for themselves instead of calling them all back every few minutes with an exciting and promising chuck. At one time I attempted to transfer a brood of three weeks' old poults from a domestic to a turkey hen, but while she was quite willing to adopt them they would acknowledge no allegiance to her. They had been accustomed to the cluck of the hen and would not respond to the persuasive crooning of the turkey. One characteristic of turkeys is that they are never cruel to each other's young. On the contrary, they usually form squads or colonies, sometimes two families uniting, sometimes all that are on one farm.

I have learned that the best mother is the one that assumes the whole care of her family and does not wait around to be fed. One summer I had a hen with eighteen little ones, and I was pleased to see her bring them up to the house several times a day, stepping around cautiously and looking in at the door in a tentative sort of way, as if to learn whether her family would be taken care of without any special effort on her part. To encourage her confidence I kept a pan of food ready for them, and how those turkeys did eat. But it was mistaken kindness, for when they were four or five weeks old they began to die from no apparent cause, and I am now convinced that it was from overfeed and indigestion. Of the eighteen only six remained, and I have ever since discouraged turkey loafers. Now I feed but twice a day after they have their liberty, and frequently the mother takes her flock to the pastures and I do not see them for weeks, but we have a lookout committee to report as they roam about the fields.

Occasionally, though rarely, a whole flock will wander far enough away to fall victims to hunters. We have not as many foes to poultry as they do who live near the "timber," and consequently need not be so careful about housing the young, but we are not wholly free from losses by accident, as for instance, last summer on two separate occasions, a railroad train ran into my flock as they were taking their sun-bath on the rails, at one time killing twenty-four of my earliest half-grown poults.

Fighting the Lice Pest.

Before insect powders came into general use I had recourse to grease with a little coal oil added, but it was dangerous to use this on young poults or on the mother hen, especially in damp weather, and rather than take such risks I frequently turned her out, depending on her taking dust baths, which she could or could not do according to the dryness of the soil. Next came the powder, but some danger to the little ones was connected with the use of this, too, and more, possibly, by withholding it. Probably all turkey raisers have been confronted with the query, to grease or not to grease, to dust or not to dust, that is the question. When I received my first can of liquid lice killer or paint I experimented on a brood of White Plymouth Rock chicks three weeks old. During incubation the mother had been in a clean, light, dry room with a soft, earth floor, so that she had ample facilities for dusting. I had dusted her with insect powder twice during the three weeks and again after hatching. She was placed with her chicks in a light, sunny room in the cellar, which was warmed by furnace pipes passing through it. Here, too, she had loose, dry earth for a bath, and on examining the chicks closely I found no sign of lice. However, I determined to test the merits of this much lauded insecticide by commencing with the smallest of my flock. After placing a paper in the bottom of a small wooden box and brushing it over lightly with the liquid lice killer, I put the chicks in and covered them over, leaving a half-inch crack for air. After leaving them for an hour I carefully removed them to a piece of white cloth and gathering up the corners I gently shook and brushed them, then opening it, I took the chickens out and looked for results.

While I did not find "a hundred dead lice" I did find enough to convince me that the paint was far more effectual than powders and so much more quickly and easily used. I gave the mother the same treatment. One occular demonstration is sufficient to insure the use of it for the future. By painting the nest boxes with louse paint, and keeping the broody turkey in a box similarly painted for a few hours before she is given her eggs, I believe the annoyance of vermin will be eliminated from turkey rearing.

When Autumn Approaches.

The hen turkeys that have been out in the fields during the summer bring their broods gradually nearer home as autumn approaches, and before the middle of October the the whole flock is together again and as comfortably established as though they had not taken a summer outing. Probably it is the hereditary instinct from the ancestral wild parents that causes the bronze turkey to love to roam and take her young far from the haunts of men.

While there is an element of danger in this inclination to wander away with the young there is also an advantage of a varied diet and consequent rapid growth, besides a great

saving of time for the attendant, but I can not believe that a larger per cent of poults would be raised if the mother were allowed to take them away as soon as hatched. At least my experience has been in favor of keeping the mother confined until the poults can run well. They are weak when first hatched, and a long tramp, even though slowly taken, is too much for them to endure. When I have given the mother and little ones their liberty as soon as taken from the nest, the largest per cent of loss occurred within the first two weeks.

While on the subject of poults I desire to add a word of caution as to the use of a liquid louse killer for very young turkeys or chicks. Their skin is extremely tender and easily irritated, therefore be sure to paint only the sides of the box in which they are placed, and have it large enough so they will not be crowded against the paint, also leave plenty of open space for fresh air for them to breath and do not leave them in the box more than an hour or two.

The poults begin to perch on a fence when six or eight weeks old or as soon as they are well feathered. If the fence is high some strategy is required to get the little fellows to the top and it is interesting to watch the process of their getting settled for the night. A fence corner is frequently selected and the young turkeys fly as high as possible at first, then fly across from corner to corner, ascending with each flight, the mother in the meantime stretching her neck and peering around to encourage them in their efforts. It is evident there is a language which they understand and by which the mother controls, comforts or warns them as occasion requires. For that matter all of our domestic animals seem to be able to communicate with others of their kind and we, who love to watch them, sometimes catch the secret.

The Fall and Winter Feed.

I have lately been experimenting with blood meal as a daily ration for a brood of White Rock chicks hatched February 15, and from their rapid growth I am satisfied that it will be a valuable addition to the feed for poults. It should be given sparingly—according to directions—and supplies the place of meat, besides it is always ready, an item of importance to most farmers' wives. The expense is slight since it is so condensed that a teaspoonful a day would be sufficient for twenty young poults. This amount could be increased if it were found desirable to keep them on limited range, or in case of late hatched turkeys it would be excellent to promote growth. Turkeys hatched later than June are not good for breeding stock the following year, but they make delicious, juicy roasts. The fall and winter feed should consist of grit, corn and wheat or oats may be substituted for wheat, if well filled out, but if light and husky they are dangerous. There is no economy in buying wheat screenings. They are liable to contain injurious seeds and are quite as expensive on the whole as clear wheat. There is no mistake made in feeding corn for fat, wheat for growth, and grit for the mill, and when the ground is covered with snow they should be given a vegetable ration of cabbage or potato peelings, but as soon as patches of grass appear they will find every tender blade. If, as is usually the case, turkeys have access to the feeding yard of cattle or hogs they will get all the corn they ought to have, but if they are deprived of this privilege it is well to give them a full meal at night—all they will eat up clean—and in the morning a handful of corn and the same amount of wheat for each turkey scattered if possible so that they will be obliged to search for it, but very few farmers have a scratching shed large enough for fifty or one hundred turkeys. I do not encourage my turkeys to eat or sleep in the chicken house, believing that keeping a line of separation between mine and thine conduces to harmony and healthfulness. I do not think it would be an advantage to turkeys to roost in a house unless it might be during a protracted storm. If they are not accustomed to it while young they gradually become inured to the cold, and nature has provided them with a coat that fits very closely in a rainy or cold season. I never had a turkey with frozen feet, although mine roost out of doors in the coldest weather. It is true they never go into tree-tops nor into trees at all, for that matter, but perch on the fence that surrounds the barn lot.

Many farmers object to raising turkeys on account of the expense and consider the amount of grain eaten by them worth more than the turkeys themselves. They do eat a great deal from November till May, but there is another side to that question. They eat a great deal from May to November that the farmer wants them to eat. Bugs, worms, larvæ and weed seeds—destructive enemies of the farmer—form the chief diet of turkeys from spring till fall. We think they pay for their keeping by what they destroy, paradoxical as that may sound, and in their behalf fearlessly challenge the comparative usefulness of "The Birds of Killingworth," as told by the student in Longfellow's "Tales of a Wayside Inn." If any readers of this article grudge our feathered friends the grain they need, will they not read that little story again? If turkeys are raised for market they should be fed more liberally than if they are designed for breeders, although the incessant demand of buyers—for stock—is for great size, and this is a strong temptation to the feeder to sacrifice future usefulness to enormous weight. I am unable to understand this requirement, since the concensus of opinion among experienced breeders is that the largest turkeys are not as prolific, nor as vigorous, as a medium size, and they are not in demand in any market. While a few raise turkeys to sell for stock only, most breeders are raising for the market, or at least mainly for that purpose, and the market standard is for plump, well-shaped birds of medium size. Very few families—except, perhaps, at the holidays—want very large turkeys, but they do want good ones. Will it not, then, be wise to regulate the supply by the demand, and instead of striving to secure the heaviest bird, try to get the most symmetrical and beautiful? We have already gone beyond the Standard in weight. Is it not time to call a halt in that direction before our work becomes impractical, and improve in shape and plumage?

In this series of articles I have not touched upon the diseases of turkeys, for the reason that I believe in the efficacy of prevention rather than cure. It is said that in China physicians are employed to keep their patients well, instead of curing them when they are ill; so with turkeys, if they can not be kept well it is usually labor lost to doctor them, because even if they live it will be with enfeebled constitutions and their offspring will inherit the same tendency, thus the flock will deteriorate instead of becoming stronger by the survival of the fittest.

Preparing Turkeys for Exhibition.

Preparation for the show room is very simple if the birds have had good care during the preceding weeks, and by this I do not mean that they should be fattened, but kept in good, thrifty condition, just such condition as you would like to have them in if you were buying instead of selling. Washing their feet—if dirty—and putting a numbered band on the leg is all the preparation necessary for bronze turkeys. On no account attempt to wash the plumage. The brilliancy would be greatly injured by soap and water, and a turkey takes perfect care of his own feathers. Of course, a careful breeder will look over his or her flock in the fall after they all get their freedom suits and in case of any "off" feathers, will mark that one for the oven, though the

per cent of culls in a flock of full blood turkeys is very small. Sometimes the wings of poults will be defective, but when the adult feathers come in the fall they will be all right, and I have known feathers to come in a little splotched the second or third season after a molt of perfectly barred wings. By splotched, I mean the white bar is wider in some places than it ought to be, showing a lack of coloring matter. When this occurs it is likely to be followed by perfect barring after the next molt. Some writers affirm that if an off-colored feather be plucked it is liable to be followed by a perfect one. I do not know how that is as I have never tried it, but think it may be true as there is something curious about the division of coloring matter, but I should be extremely suspicious of a feather nearly all black or nearly all light. It would show conclusively that somewhere in the past history of that bird, blood other than Bronze, had been introduced and it would be very difficult to cross it out. It might disappear in one generation to reappear in the next. It would hardly be possible that every bird in a large flock should be excellently marked, but by severely and conscientiously culling for a few years a large per cent of them may be. The great risk in introducing new birds into a flock arises from the fact that so few who raise turkeys know what the markings of their birds ought to be or are. They probably know their weight but are unable to give a detailed description of them, being satisfied that they are "good" when they may be very inferior. A thorough knowledge of what they ought to be in every respect as to size, shape and markings is the only basis on which a breeder can sell with satisfaction to himself and his customers. It is not sufficient to say he has good birds, but he must be able to tell in what respect they excel or where they are faulty. If he does this honestly and truthfully it matters little whether he has a score card to go with the bird or not, providing always that the buyer knows, too. If he does not it is safer to have the score card to sell by, since it follows almost invariably that the least experienced are the most difficult to please, and the score card is a protection to the seller.

MRS. S. N. KING, Illinois.

CAPONS AND CAPONIZING.

What Hon. F. L. Washburn, of the Oregon Experiment Station, Says About Capons—Actual Experiments in Caponizing, With Results—Full and Explicit Directions for Caponizing (With Illustrations).

THE commercial side of the business of poultry raising is coming rapidly into prominence. It has been surprisingly neglected in times past. But the time of change is here, and now the general government and several states are taking a practical interest in the subject. Experiment stations are at work investigating the mooted questions of poultrydom and the results can not be other than beneficial. The Dominion government to the north of us has also established experiment stations, and the poultry industry is now receiving intelligent and widespread attention. We trust that the day is not far distant when every country and state fair will have its large poultry exhibit, consisting of both pure-bred and commercial specimens, the former to comprise thoroughbred land and water fowls, bred to standard requirements, and the latter, crosses, capons, etc., produced with a view to the greatest commercial value.

In an official bulletin, F. L. Washburn, of the Oregon Experiment Station, gives results of a number of experiments in this branch of poultry culture, from which we quote as follows;

"A capon bears the same relation to a cockerel that a steer does to a bull; it is an altered rooster. As in the case of steers a capon is more quiet, lays on much flesh and fat and remains tender for many months after the operation. Caponized birds seventeen and nineteen months old have been killed here whose meat was extremely delicate and tender. They will, furthermore, weigh from 20 to 30 per cent more than a rooster of the same age, if kept the proper length of time, and in many eastern markets will bring from eighteen to thirty cents per pound. The comb and wattles do not grow after the operation. The feathers of the neck and saddle grow enormously long and become very glossy. They do not chase the hens; they neither crow nor fight. For a few months after caponizing they are very hearty eaters; but later do not consume appreciably more food than ordinary fowls."

CAPONIZING ON A FARM.

How Not to Succeed vs. How to Succeed—$1.00 to $1.25 Apiece for Barn-yard Mongrels.

BY J. C. HOVER.

During the summer of 1894 I caponized 270 birds of all colors, sizes, ages, weights, etc., 100 for myself and 170 for my neighbors, charging them five cents each for the work, and contracted for the capons to be delivered any time after January 15, at 12½ cents per pound. Of the 270 caponized twelve died from the effects of the operation. Almost every one of these died within fifteen minutes after the operation.

My 100 were B. P. Rocks and averaged when caponized three pounds each—too large for safety, but I had good success. I did not want to take the room in my best poultry houses, which were arranged and yarded for fifteen laying hens each, so these 100 capons, to say nothing of almost as many hens and other fowls, were given free range with a single all-purpose farmer's chicken house to roost in. The house would possibly have accommodated fifty with some degree of comfort. Need I give the result? Every poultryman knows the evil results arising from that fertile cause—overcrowding. But this is for the benefit of the farmer who has but one poultry house, and for the inexperienced poultryman who should be willing to profit by the mistakes of others. The capons did as well as could be expected under the circumstances, which was but a very little gain in weight until about November 1. When the cold winds began to whistle and the free range did not furnish much forage they showed signs of roup, which soon developed into the most malignant form of that dreaded contagion, and sixty-five of them gave up the struggle of life before I succeeded in stamping it out. Of the remaining thirty-five, some of them escaped the roup, others had it and recovered. These were put into good, dry, comfortable quarters, and were

well cared for, but it was impossible to get them heavy or to be anything like good capons.

They were shipped January 20, by freight, to a commission house in New York, and on arrival I received the following: "Can't sell your guinea feathers at any price." To which I replied: "Mistake; no guinea feathers shipped. Please remit at once for capons."

In a few days I received the account of sale:

One box poor chickens, 125 lbs., at 11c	$13.75
Charges	1.85
Check	$11.90

"Those who want capons want capons, and want them to weigh from seven to nine pounds each. No capon dealer would buy these at any price; too thin and poor."

A check for $11.90, which by dividing the hundred into three or four flocks and properly caring for them, might have been increased to $125 at least, as capons were wanted at eighteen and twenty cents. That one mistake cost me not less than $100.

Do not let this statement make the impression that capons are delicate and will more readily contract disease than other fowls, for this is not true, and I am convinced from my three years' experience with about five hundred capons, kept in various ways, that they are hardy, and if any difference, will surpass in thrift other fowls given the same care. Do not overcrowd your fowls of any kind, for if you do your profits will be on the wrong side of the ledger.

Out of 175 caponized for my neighbors, I received 130, as per contract, at twelve and one-half cents per pound. As they averaged seven pounds (nearly), the average price was eighty-nine cents each. They averaged, dressed, six and one-half pounds (nearly). A capon will dress away about one-eighth. These were shipped at different times from January 15 to the last of March, to New York and Buffalo. The average price received was eighteen cents per pound—the highest being twenty cents, and a few pounds of very undesirable birds going at eight cents, the lowest.

The farmers were well satisfied with the eighty-nine cents "apiece" for their "chickens," and no particular effort had been put forth to have the cockerels early hatched or to produce anything more than common farmyard mongrels, except one or two families that have been stimulated up to produce early "full-blood" Barred Plymouth Rocks. This year a few specimens of this breed have reached ten pounds, and brought their owners $1.25 each.

A house and yard stocked with a cross of the large breeds for capons alone might be had on every farm and the profits herein given would be doubled, for it is the heavy capon that sells for the highest price. Farmers in almost any district can ship their own capons and other poultry if they care to take the risk, and save all the money the middleman gets. I do not recommend any particular commission merchants, but there are some that make a specialty of capons.

CAPONS AND CAPONIZING.

Actual Experience Recited—Weight of an Eleven-Months-Old Plymouth Rock Capon—Profits on a Barrel of Capons.

BY DR. RICHARD SCHMIDT, BREEDER.

In answer to your request I give you my experience in regard to capons. I read about capons in a poultry journal and decided to try my hand. I was then breeding Light Brahmas, Plymouth Rocks, S. C. B. Leghorns and Houdans, and had started with a sitting of Cornish Indian Games.

I bought a caponizing spoon and hook from W. H. Wigmore, and with the assistance of a scalpel, a pair of dressing forceps and a nasal speculum (used for a dilator of the intercostal incision) I went to work.

My hired man built a table for the purpose, boring two one-inch holes about ten inches apart on one side of the top for the purpose of making the cockerel secure. We attached a piece of manilla twine about eighteen inches long, to a nail on the right hand side of each hole, allowing the string to pass down through the hole, and fastened a brick to each loose end of the string. Now, taking a cockerel from my assistant, I passed both legs through the loop made by the string from nail to hole, and found my brick was heavy enough to hold the legs. The cockerel being on his left side with his back toward me I now took the right wing and passed the loop of the other string with a suspended brick attached, over it, and I had my fowl foul.

Making an incision between the last and next rib about one-half inch from the backbone, I extended it about one inch toward the median line. Now, by using my nasal speculum for a dilator I found that the right testicle was in full view with only a thin serous membrane intervening. With the hook on the small end of spoon I tore open the membrane and said, Eureka! I removed the right testicle and then looked for the left, which, after much diligent search, I found on the other side of the spinal column. The excessive manipulation to which the delicate membranes were subjected in my search for testicle No. 2 (left) caused me in future to designate left testicle No. 1 and right (or easier one to get at) No. 2.

Plymouth Rock Capon, as bred, and marketed by D. T. Roots, proprietor of May R. Poultry Plant.

My first prospective capon died of uncontrolable "hemorrhagica interna" in about forty seconds.

My next one was a Plymouth Rock (I neglected to say my first was a Light Brahma) of the barred variety. I went through the same operation with him, except that I removed the left testicle first and made a brilliant success of it. He was out of a ten-pound cock and an eight and one-half pound hen, and at seventeen months old (I must tell it, for murder will out), he defeated a Light Brahma cock, the property of a farmer of Marion County, Mo., by name Snodgrass, at Marion County, Mo., in September, 1892, by taking the blue ribbon given to the largest cock exhibited. My capon at fifteen and one-half pounds defeated a fifteen-pound Light Brahma cock. "Eureka" two times!!

In the spring of 1891 I caponized 167 cockerels, ate a good many, treated several of my friends to a capon dinner that Christmas, and shipped a barrel of capons to New York City, from which I realized $31.50 net profit. There were twenty capons in the barrel and they dressed two hundred and ten pounds at about eleven months old. They were incubator and brooder raised and fattened like pigs, in a row of coops, each 18x18 inches and 2½ feet high, giving all the corn and wheat they could clean up.

The mortality of capons in 1891 was 1.67. I lost two out of one hundred and sixty-seven, one being my first and the other my fifth. The latter was lost on account of the use of a pair of scissors with which I thought to facilitate the operation. Having a very rebellious spermatic cord to twist off I snapped it in two with my scissors, since which time I have had no use for scissors in caponizing, for my would-be capon passed quietly away like No. 1, a victim of "hæmorrhagica interna arteriæ spermaticæ," a very easy and apparently painless death.

Since 1891 I have caponized some cockerels each year, both for myself and for my friends. The present spring I propose to caponize all my Cornish and White Indian Game cockerels not coming up to the requirements of the Standard, and shall exhibit some of them at the poultry shows which I patronize next winter. I expect to show some of the finest carcasses in capons exhibited and to give the Indian Game variety of fowls such a boom that every Indian Game breeder (myself excepted) will be ashamed of himself (or herself) for not doing more to make his loved variety noted.

$2,347 WORTH OF CAPONS.

The Amount One Buyer in an Iowa Town Paid for Capons in Three Months.

ALLERTON, IOWA.

Editor Reliable Poultry Journal:

To dispose of at a profit the cockerels which usually predominate in the hatches, has been one of the problems for the poultryman and one that he has not completely solved. Caponizing offers to him a new and fertile field of operation, one that will yield him great profits and whose hidden treasures can not be exhausted, as food is always a staple.

Heretofore in the Mississippi and Missouri valleys what cockerels we could not get to market at a fair price during the brief broiler season had to be sold as old roosters at one dollar per dozen, if we were lucky enough to get that much. By the process of caponizing one bird can, with less cost to the producer, be made to bring from sixty cents to eighty-five cents, and a dozen birds thereby be made to realize to a poultryman or farmer from seven to nine dollars. This is no crank poultry talk, it is cold facts. We have been doing this well in this vicinity for four years. One buyer here at this point paid out $2,347 for capons alone in the winter of 1896–7, in December, January and February. One farmer's wife that winter brought in one hundred capons that brought her $90, and the next season she brought in one hundred and ten that brought her $97.50. Caponizing has increased the profits of the poultry business enormously in this vicinity, and our people are in the capon business to stay.

The operation, while requiring care, is a simple one and is being performed in this locality chiefly by boys and women and they seem to be doing a thriving business in the caponizing season.

As the contention for profitable employment increases and economic conditions drive us to glean the fields of production more closely, all these byways and corners must be worked out and every means of profit brought into operation. From a practical point of view it is just as necessary to caponize a cockerel for market and table use as it is to steer a calf or barrow a pig when meant to be used for food, in order to get the best results in weights and in consequent profits.

When we contemplate the prices that capons bring, ten to twelve cents per pound here at our own depot, when hens sell at from five to six cents per pound, the wisdom of caponizing must be plain to any one. If it pays to raise a calf to a steer or a pig to a marketable hog, it likewise pays to caponize and mature a cockerel. The poultry people in this vicinity are going to do their share this year towards pushing forward the western capon.—From Reliable Poultry Journal.

Has Grown Rich At It.

Mr. Allen, a resident of New York State, began as a boy years ago to buy common poultry and eggs for market, going from farm house to farm house. He kept branching out until he now buys and ships to Philadelphia and New York mar-

Capons at Geneva, N. Y., Experiment Station.

kets $150,000 to $175,000 worth of poultry and eggs each year. He stated that probably his business in this line will reach $185,000 this year. He buys practically all of this amount within a radius of twelve miles of Glassboro, so it may be seen that this is quite a poultry raising section. He has men with wagons who make regular trips out through the country.

On July 6th, which is late in the season, Mr. Allen was paying ten cents per pound for young ducks and twenty-one and twenty-two cents per pound for spring chickens—the larger the better. "The duck market," said he, "is being overstocked this year here in the east. The price for ducks is now lower than I have ever known it to be, while the demand for choice spring chickens at good prices has been away beyond the supply. There is good money in spring chickens at the present prices."

"Capons pay well," continued Mr. Allen. "They bring twenty cents a pound from Thanksgiving to April 1st, then range down to fifteen cents. I bought five hundred from one man this spring. The largest pair I have bought this season weighed twenty-eight pounds, and I paid the owner twenty cents per pound for them. Capons should be marketed when from seven to twelve months old.

"I do all I can to encourage farmers and farmers' wives to raise better stock each year, to improve its size and appearance when dressed by using Standard bred males with their flocks. They have done this until I am now able to buy much choicer dressed poultry and to get top prices for it. I buy it all dressed and aim at the top of the market. As a matter of fact poultry is the best paying crop raised in this section. There is no doubt that it pays better than any other crop marketed. Many people have found this out and others will.

"Last year I bought five hundred and seven tons o

dressed poultry, all within a radius of twelve miles of Glassboro. Farmers' wives raise the most of it. Now and then you will find a farmer who turns in and helps, but the women in this section raise most of the poultry.

"I like Wyandottes best for early fries, for broiling, but for five and eight-pound roasters, the Cochins, or crosses of the Cochins, are the best and tenderest. The introduction of Asiatics has increased the weight of market poultry in this section from two to three pounds per head. A cross of Light Brahmas and White Plymouth Rocks makes a fine roaster. I constantly advise farmers to buy big, vigorous, thoroughbred males to put with their common hens, and they are doing it. Those who do this and take pains soon find their poultry to be the best paying crop they raise."

CAPONIZING—HOW TO DO IT.

Full and Explicit Directions for Caponizing.

Every poultry raiser has each year a large number of surplus cockerels. These he finds it hard to dispose of at a profit. In the market he can seldom get for them (in their natural state) more than one-half or two-thirds of what he can readily obtain for pullets and hens. It is a fact, however, that when properly caponized and brought to a marketable size, he can obtain for these same cockerels, now developed into capons, twice as much as he can get for his pullets and hens.

A Chicago commission merchant, with whom the writer had a talk on June 2, 1898, reported capons selling at twelve to eighteen cents per pound in that city during the season, and the demand strong. He was then handling capons bought from Illinois, Ohio and Indiana that weighed ten, eleven and twelve pounds. They were killed when from ten months to a year old.

Directions for Caponizing.

From twenty-four to thirty hours before performing the operation, select such cockerels as you intend to caponize (these should be from two to four months old), confining them in a clean and airy coop or room without either food or water. The best time to confine them is at early morning, as their long fast will then end about noon of the following day, at which time the operation is best performed. Should the day be cloudy or wet do not caponize them, but let the operation go until you have a bright and fair day. It is necessary that you have all the light possible in the matter. If it be a cloudy day and you decide not to caponize, the birds may be given a little water and food if necessary, but it is much better to avoid this if possible, as it is very desirable to have their intestines quite empty, thus allowing their testicles to be more readily seen, besides giving the operator much more room in which to perform his work. Lay the bird on the operating table (this table is fully described elsewhere in this article) on its left side. Wrap the cord

Fig. 1—Cord for Holding Fowl.

Fig. 2—Knife for Making Cut.

(Fig. 1) twice around the birds legs, above the knees. In making one wrap only, there is danger of the birds kicking themselves out of the loop. Hook the other cord once around both his wings, close to the body. To the opposite end of these cords attach a half brick, or some other weight, letting them hang over the sides of the table. This holds the bird securely. Have all your instruments in readiness, that you may work quickly. Thread the canula (Fig. 5) with a strong and long horse-hair or fine steel wire (we think wire the better), letting the wire form a loop at the curved end, and extend well out at the other end. Now, after slightly wetting the spot, proceed to pluck the feathers from the upper part of the last two ribs and just in front of the thigh joint. Pull the flesh on the side down toward the hip, and when the operation is finished the cut between the ribs will be entirely closed by the skin going back to its place. While holding the flesh back with the left hand, with the right hand take the knife (Fig. 2) and insert it (cutting edge away from you) between the last two ribs, cutting first down, and then up a little way, following the direction of the ribs, making the cut not over one inch long. Cut deep enough to go through the skin and flesh, being very careful not to go so deep as to cut intestines. There is little danger of doing this, however, if they are empty, as they will be from the bird's long fast. The danger of cutting the intestines is when they are full, as in this state they press against the ribs. Should the cut bleed, stop a moment, let the blood clot on the thin skin covering the bowels, and then remove it with the spoon forceps. Next take the Spring Spreader (Fig. 3), press it between the thumb and finger until the ends come together, inserting the ends in the incision, with the spring end toward the bird's feet (see operating table). Upon looking into the cut a thin tissue-like skin will be seen just under the ribs and enclosing the bowels. Take a sharp hook (Fig. 4) and pick the tissue open, so that you may get into the bird with the instruments. The breaking of this skin does not cause the least pain to the bird. One of the testicles will now be brought plainly to view, lying close up to the back of the fowl. Sometimes both testicles are in sight, but this is not generally the case, as the other one lies

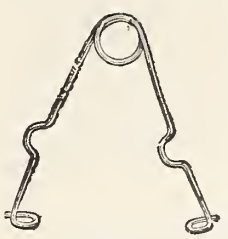


Fig. 3—Spring Spreader.

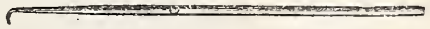


Fig. 4—Sharp Hook to Open Film-like Skin.

beyond and more on the other side of the bird, the intestines preventing it from being seen from this opening. The testicle brought to view is enveloped in a film. This should be brought away with the testicle. Some people, in caponizing, tear the skin open and then take the testicle out. The danger in so doing is, that if this skin is left, there is danger of causing a "slip."

Now comes the only dangerous part of the whole operation, getting hold of and removing the testicles; but with a steady hand and plenty of light not one bird in fifty should be lost. Attached to the testicle and lying back of it is one of the principal arteries of the fowl, and this, if ruptured, is sure to cause death. It is here that the canula (Fig. 5) proves of great advantage. The hair (or wire) being small and very fine, is easily slipped between the testicle and artery without injury to either, and a clear, clean cut made. Take the canula in the right hand and adjust the hair (or wire) in it so that a loop about one-half inch long will extend from small end of tube, leaving the two ends of wire extending far enough out of the open end to secure a good hold. Insert the end of the tube that has the loop on it very carefully and slip the loop over both ends of the testicle and entirely around it, hold end of tube close down to the testicle. When the testicle is entirely encircled by the loop, take both ends of the wire (or horsehair) which comes out of the other end of the tube with thumb and first finger, holding it tight, and draw up on it carefully but firmly, being particularly careful to have the loop around testicle. Keep the end of

the tube very close to testicle all the time. If drawing up on the wire does not at once cut testicle, slightly turn from one side to the other (but not entirely around), then the testicle will come off. After removing it, carefully examine inside of bird to see that no piece is left in, and also to see that no foreign substance, such as feathers, etc., has gotten in. If any have, it is necessary to remove them, for if allowed to remain, they are liable to cause inflammation. Sometimes a feather or part of the testicle may drop among the bowels; if this occurs move bowels around with probe

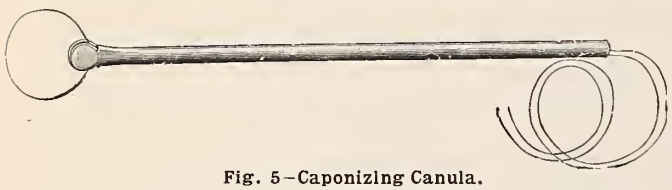


Fig. 5—Caponizing Canula.

(Fig. 6) until the object is found, then remove with spoon forceps. When the operation is performed, remove the spreader at once and the skin will very soon slip back over the cut and heal in a short time. Never sew the cut as it will heal just the same as any other small flesh wound.

The bird can now be turned over on its right side, cut made and testicle removed in exactly the same manner as just described for the left side. Both testicles may be taken out with the one incision, but to the learner we would say

Fig. 6—Caponizing Probe.

this is attended with more difficulty than the two incisions. The other testicle being situated so far over on the other side, there is more difficulty in reaching it, besides danger in piercing artery running back of first testicle. To an ex pericnced person there is no danger in removing both testicles from one incision, but to those who have not that degree of confidence given by practice we would recommend the two cuts. The bird recovers just as quickly as though one cut were made, and the operation is performed equally as quick, if not quicker. If both testicles are removed from one cut, the lower must always be taken out first. for if the top is first removed, the small amount of blood that may follow will cover the lower one, keeping it from view.

The Best Time to Caponize.

Fowls hatched early in the spring make the finest capons. They can be cut before hot weather comes, which is a great advantage although no ill results follow the operation at any time in the year. The bird should be from two to three months old (not over six months,) and weigh not less than a pound to a pound and a half. The size is equally as important as the age. June, July, August, September and October are the months generally taken for caponizing, for the reason that spring chickens arrive at proper age and weight for market during the months of January, February, March, April and May, at which times there is the greatest demand for them in the cities, and the highest prices secured. That capons are in our markets at certain seasons only, is because the demand is far in excess of the supply. The time will be when capons may be obtained the year around.

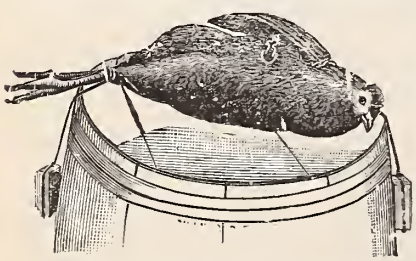


Table No. 1—The above Photographed and Engraved from Life, Illustrates the Method of Holding Fowl Ready for Caponizing.

Operating Table.

The top of an ordinary barrel (see illustration) meets all requirements of a table, admits of the birds being easily secured, brings the birds to the proper height with the operator; in brief, makes as good a table as can be desired. It costs nothing, as there is always an empty barrel lying around, or one that can be easily emptied.

Feeding Capons.

The question is often asked: "How are capons to be fed?" After caponizing give the bird all he will eat of soft food, and let him have plenty of water. Caponized fowls begin to eat almost immediately after the operation is performed, and no one would think for a moment that a radical change had been made in their nature. Now leave the bird to himself, as for the time being he is his own doctor. It is well to look him over two or three days after the operation, as in breathing, the air sometimes gets under the skin causing "wind puff" or a slight swelling, in other words. Simply prick through the skin at the sides with a sharp needle, gently pressing at the same time, when the air will be expelled and the capon relieved. Within ten days from the operation the wounds will be healed over. A day or so after caponizing the bird should be allowed to run at large, treating him just the same as any growing poultry would be treated.

Killing and Dressing Capons for Market.

The capons should be allowed to grow at least one year old. By this time they will have attained an imposing size. Some keep them even longer than a year. While this is optional with the raiser, yet we should not advocate killing them under one year old if they are being raised for market.

There is a great difference between the dressing of capons and an ordinary fowl.

When the capons are ready for market, select such as you propose killing, and confine them. Keep them without food or water for about twenty-four hours before killing, that their crops may be entirely emptied. Now get ready your place for killing and dressing the fowls (if you have conveniences in the chicken house this will do quite well, or the woodshed, or any cool outhouse), and drive two heavy nails or wooden pins about one foot or less apart in an overhead beam. Make two nooses of strong string, each noose long enough to hold one each of the legs, and have the capons hang low enough to pluck with ease. Have a weight of two or two and one half pounds attached to a hook, and when the bird is killed, fasten this hook in his lower bill after you hang him up for plucking. The weight holds the bird in position while picking and renders the operation much easier.

Next procure a table to dress the fowl upon, and make a frame on the same principle as a small box without the ends and cover. In this you lay the capon, back down, to remove the intestines.

When everything is in readiness take your capon and suspend him by the two legs from the nooses. Catch hold of his head, and with your poultry killing knife cut vein at back of throat, through the mouth. Never cut this from the outside. Immediately upon cutting vein, run point of knife through roof of the mouth clear into the brain. This operation causes what is termed "dropping the feathers," making them come off

Poultry Killing Knife.

more easily. As soon as the knife enters the brain the bird loses all sense of feeling. Begin plucking at once.

As to the style of dressing, the feathers are left on the wings up to second joint, the head and hackle feathers, also on legs half way up to the drumsticks, all the tail feathers, including those a little way up the back and the long feathers on hips close to tail. These feathers add greatly to appearance of the bird when dressed, and are also a ready marker from other fowls in markets. Never cut the head off, as this is a distinguishing feature of the bird. A capon may readily be identified among a thousand cockerels, as the comb and wattles cease to grow immediately after caponizing is performed. Wash head and mouth well with cold water, being careful to remove all blood. A capon should not be torn in plucking. There is no danger of this happening if proper care be taken. Place the plucked fowl back downwards in the box frame already described. Cut carefully around the vent and pull out the intestines. These will be found covered with fat, which, as they are pulled out, should be pushed back. When the end of the intestines is reached, insert your finger and break this off,

Capons Dressed for Market, Showing Manner of Leaving Feathers on Head and Neck, Wings and Legs.

leaving everything else in. As may be expected the fat will be found very heavy around the opening, and if slightly turned outward will soon become hard, which will give a rich appearance in this portion of the bird. Let the birds hang in a clean, cool place until thoroughly cold. For packing use a new box of the required size, lined with white paper (any good, clean paper will do). Pack the birds in solid, back up, being careful not to bruise them. Your birds are then ready for market. With a bird not torn and the feathers properly left on, you have a fowl which for inviting and "taking" appearance it is impossible to equal.

A "slip" is neither capon nor cockerel. He is much inferior to the former and a great deal worse than the latter. The "slip" is caused by not entirely removing the testicles. The smallest fraction left in the bird will grow again with no benefit to the fowl.

Our first advice would be, "Keep cool and make haste slowly." If you are rather tender-hearted, read the directions over carefully and then try your hand on a dead fowl. All surgeons do this in the first place, and probably it would be as well for you to follow their example. Have plenty of light. It is impossible to perform the operation unless you have this. After your first performance of caponizing you will be surprised at its simplicity. Always keep your instruments in perfect order. Before using the knife see that the edge is sharp, and that the other tools are as they should be. After beginning the operation of caponizing there should be nothing to hinder you from going right ahead.

MARKETS FOR CAPONS.

Open Letters from Leading Commission Men of Chicago and Philadelphia, Treating on the Capon Season, the Prices Obtainable, the Weights in Demand, Killing, Dressing, Etc.—Best Breeds and Crosses for Capons—Suggestions for Feeding, Fattening and General Care.

With a view to securing reliable and timely information, "from headquarters," regarding the season for marketing capons, the prices obtainable, how to kill, dress, etc., we addressed letters of inquiry to the Sprague Commission Company, Chicago, and Philip Quigley, Philadelphia, leading dealers in poultry and eggs in their respective cities.

The Chicago Market and Other Information.

Chicago, Ill., Aug 10.

We reproduce herewith cuts of capons, showing just how this class of poultry should be dressed for this market. You will notice that the feathers are left on the neck, legs, wings and rump, and also that the tail feathers are left on. Otherwise capons should be dressed for this market the same as other fowls, except that they should be dry picked, as it would be impossible to scald them and leave part of the feathers on, and if they are scalded the same as other chickens, they will not bring any more than the price of common fowls, for they are distinguished more by the way they are picked than in any other manner. All other chickens sell better in this market scalded, while turkeys sell best dry picked.

Capons are in the best demand with us from the first of November until the first of May. The highest prices are generally obtained from January to May. For the last year or two there have been a great many common roosters dressed in capon style and sent to this market, which has hurt the capon trade some, but still good capons always bring a good price. The larger the birds are, the more they will bring per pound. Birds that weigh less than seven pounds each will not bring any more than common chickens, as a rule. Each year the call in this market for genuine, large capons becomes greater. The reason of this is that people are becoming educated to the enjoyment of the luxury.

Looking over the quotations on January 1, we note that large and choice capons sold, dressed, at fifteen cents per pound, while mixed lots brought twelve cents per pound. What are termed "slips" (cockerels that have been imperfectly caponized) sold at from eight to ten cents per pound. A capon will bring upwards of three times as much as a cock. Capons grow to be larger and heavier than cocks and may, if well bred, be made to attain a size of from twelve to fifteen pounds each. A capon of such weight will sell for from $2 to $3, while a cock will not bring more than fifty cents. Yet it costs just as much to raise cocks as to raise capons.

When raising capons the breed should be carefully considered. If the operation is performed early the capon will not develop a comb. The operation should be performed before the bird is three months old. It is a waste of time to use small breeds and scrubs, as they will only sell as second class stock. The largest capons, according to our information, are produced by crossing a Dorking male with Brahma hens, and the best in quality are produced by keeping the pullets of the Dorking-Brahma cross and mating them with an Indian Game male. The capons so produced combine the size of the Brahma, the compactness of the Dorking, and full breast and juicy qualities of the Indian Game. Other good crosses may be made by the use of Houdan male, with Brahma, Cochin, or Plymouth Rock hens, or the Dorking or Indian Game may be used in place of the Houdan. The hen should always be large. The form and quality are mostly derived from the sire.

A capon grows and fattens on a small amount of food. The first point should be to secure large frames and fatten them after they are fully matured. If the capon is produced from a large breed it should have plenty of time for growth – about fifteen months—for every pound is valuable. The food should be nourishing, but not fattening. Corn is unnecessary until near the time for fattening. Wheat, oats, pounded bone, meat, milk and green food, all that it can eat twice a day will be sufficient to help capons rapidly in growth.

Capons should be put in a small yard (not too crowded) three weeks before being sold and fed four times a day, giving plenty of corn and also a variety of other food. One of the best preparations for fattening capons is cornmeal and ground oats, equal parts, adding half a pound of crude tallow to every quart of the mixture. Moisten the whole with skimmed milk or boiling water and season with salt.

Buyers are not so particular about the size of the legs and skin of the capon as they are of its size and attractive appearance in other respects, yet a yellow leg capon holds an advantage. Yellow legs may be secured by using Plymouth Rock males on pullets that have been produced by mating a Dorking male and a Brahma hen. Such a capon will be of excellent quality and will always bring a good price. Light Brahma males are also mated with Cochin hens in order to secure large capons, but they do not have that full breast which is imparted by the Houdan, Dorking or Game. If the color of the legs is of no consequence, the Houdan male and Langshan hen produce excellent capons when mated.

The comparison of a well-bred, well-kept and well-fed capon with a cock of the same breeding, will show that where a cock reaches ten pounds weight in a given period of time, the capon will weigh one-third more, and the difference in price is three to four times as much. If, instead of keeping the yards full of useless and unprofitable cockerels caponizing were resorted to, there will be a greater desire to have more cockerels hatched than pullets. By keeping good breeds, neighbors may be induced to use the eggs for hatching purposes. Then the surplus cockerels may be bought at a slight advance, as they will prefer to keep the pullets for their own use. By then providing the neighbors with pure-bred males every season there would be no limit to the supply of eggs for hatching cockerels for capons.

P. H. SPRAGUE,
President Sprague Commission Company.

The Philadelphia Market.

PHILADELPHIA, PA., August 13.

Editor Reliable Poultry Journal:

Replying to yours of recent date, will state that capons are in active demand in our market from February 1 to May. Last season they ranged in price from twelve to sixteen cents per pound. It is not any advantage with us to have them unusually large, as birds weighing five pounds each sell as readily as those weighing seven pounds or more. For the past three seasons they have been ranging in weight from five to seven pounds each, which gives general satisfaction.

Yours truly,
PHILIP QUIGLEY.

Poultry for Market.

PHILADELPHIA, PA., March 19.

Editor Reliable Poultry Journal:

You will find instructions for dressing and shipping poultry on the back of the enclosed circular. From the first of March to the first of November poultry should be shipped alive, or if shipped dressed should have sufficient ice in the barrel to prevent it from spoiling in transit. It would be safe to ship dressed poultry from November to March without ice, as during that time the temperature is lower.

Impress on shippers the necessity of permitting the entrails to remain in all poultry and game, with the exception of rabbits and venison; the entrails should be removed from the latter two animals.

I have had three shipments of Light Brahma cockerels from E. H. Upson, of Indiana, and got him thirteen cents per pound.

We charge five per cent for selling goods and deduct the expressage, etc. Thus:

1,000 pounds, 10 cents	$100.00
Less express	$10.00
Commission	5.00
Net proceeds	$ 85.00

If I have missed giving any desired information please let me hear from you.

Yours truly,
PHILIP QUIGLEY, Commission Merchant.

Explicit Directions.

Selecting.—Select nothing but well-fattened stock. Full crops are undoubtedly a great injury to poultry, and often taint the whole fowl, giving it a sour, bad flavor; besides, if it is kept from feed twenty-four hours before killing, the food becomes fully digested and, having passed off, leaves the entrails comparatively clean.

Killing.—The best mode of killing fowls is to stick them in the mouth, being careful that they bleed freely, and that the blood does not collect around the head, causing that part to spoil much quicker than it otherwise would. Pick the feathers while the fowl is bleeding and be careful not to bruise or tear the flesh.

Dressing.—Poultry should be dry picked, not scalded. They should then be hung up by the legs or spread upon shelves in a dry place, but not in a draft where they will

become "wind dried." They should not be packed until the animal heat has had time to escape. Care should be taken not to allow them to freeze before being packed, and it is much better to reach market free from frost. The head and feet should be left on; they should be well cleaned, but the intestines should not be removed.

Packing.—Barrels should be used for packing all kinds of poultry. Pack as compactly as possible, always lining the barrel with clean paper, and see that the package is so well filled that when the cover is on the contents will not be shuffled about in handling. Never use straw in packing poultry, for, besides creasing their bodies, there is always more or less chaff, which detracts from the appearance of the fowls.

DISEASES OF POULTRY.

How to Prevent, How to Treat, How to Cure—Remember the Old Adage, "An Ounce of Prevention is Better Than a Pound of Cure.

BREEDERS who look well to the sanitary arrangement of their buildings, and apply a proper system of feeding, have little to fear in this direction. The best remedy is the keeping in mind at all times the old adage that "An ounce of prevention is better than a pound of cure." Fowls need but little medicine if properly cared for, the essential features of which are being well protected from the wind and rain, having dry, clean, light, warm and well-ventilated quarters, with a good grass run in the summer and plenty of fresh, cool water. If these conditions are complied with, and the fowls are well fed, we would be willing to insure poultrymen against disease, unless it be introduced by some fowl that was already diseased.

Roup.

Roup is an inflammation of the membranous lining of the air passages, which often makes its appearance in the cleft palate, the mouth and the eyes. It is more destructive and harder to handle when let run awhile than cholera. Its first symptoms are slightly catarrhal, affecting the appetite and health of the chick but very little, and in the second stage it becomes ulcerous or diphtherial roup, and is nearly related to malignant diphtheria in the human family. It is caused from filth, bad food, cold and wet. The eyes water, the nostrils are closed, breathing becomes deep and difficult, together with coughing and suffocation.

Treatment.—Pen up every fowl in dry, warm quarters, keep out all the drafts of cold, damp air; feed hot bran, mashed potatoes and meat, and medicate the throat, mouth and nostrils with chloride of sodium or common salt as follows: Take a bucketful of warm water, put a teacup of salt to this amount of water; then, catching the fowl, examine the throat and nostrils, removing all cheesy matter and pressing all mucous matter out of the nostrils, and then filling a pint cup for each afflicted fowl, hold it by the feet with head down, choke it until the mouth is wide open and then insert the head into the solution, comb down, so that the medicated water may enter the cleft in the palate and go out at each nostril and into the throat. Each should be separately treated. Not all from the same water, but one cup will do for all. Kerosene injected into the nostrils is good; also camphorated sweet oil. Ten drops of coal oil or kerosene added to two quarts of water for a flock of twenty fowls will often effect a cure, but when this remedy is applied do not attempt to prepare one of the flock for table use for three or four weeks thereafter, as the entire carcass will be tainted with coal oil. A great deal of this trouble may be avoided by keeping your poultry clean and their quarters free from dampness.

Important.—In treating roup, be careful to remove any discharge from the nostrils that may collect on the feathers under the wings or on the breast. Whisky or alcohol will wash off this discharge. Be sure to protect the sick fowls from all drafts and feed easily digested foods. When the fowls look stupid and droopy, feathers ruffled and no appetite, reduce their food even to fasting. If digestion is impaired give the following:

Tincture of Nux Vomica..... 1 drachm
Alcohol dil. (half water) ....9 drachms

Mix. Add 15 drops to half pint of water and let the sick fowls use it as a drink once or twice daily until better. This is a valuable stomach tonic, especially when the food disagrees.

Compound tincture of chinchona, 20 drops in a half pint of water, is often serviceable as a general tonic.

It often occurs that fowls have swellings of the head and feet which are sometimes troublesome. Where it is possible, use a bandage or compress with warm water; then apply the following:

Oxide of Zinc Ointment..... ..... 1 ounce
Stramonium Ointment..... .....½ ounce

Mix. This can be applied in all cases where an ointment is necessary.

Cholera.

This disease is caused principally by keeping too many fowls in a limited place, bad sanitary management, unwholesome or irregular food, etc.

Symptoms.—The symptoms of chicken cholera are not well understood by the people generally, and it is probable that some men have that disease "on the brain;" so much so, in fact, that whenever they lose fowls by an unusual disease that they do not understand they attribute their death to cholera. Many fowls go to their graves, so to speak, by other diseases, and cholera is blamed for sending them there.

Some of the prominent symptoms we give, and, so far as known, the condition of the internal organs.

External Symptoms.—The fowl has a dejected, sleepy and drooping appearance, and does not plume itself; it is very thirsty, has a slow, stalking gait, and gapes often. Sometimes the fowl staggers and falls down from great weakness. The comb and wattles lose their natural color, generally turning pale, but sometimes they are dark. There is diarrhoea with a greenish discharge, or like sulphur and water, afterwards it becomes thin and frothy. Prostration comes on, the crop fills with mucus and wind, and at last the food is not digested, breathing is heavy and fast, the eyes close, and in a few hours the fowl dies.

When fowls die it is very easy to say that they died of

cholera, and so let it go; but if the symptoms were not substantially as given above, an autopsy would show that it was not that disease.

On dissecting a fowl that has died of cholera, the gizzard will be found to be filled with dried-up or sometimes with a greenish matter, and the crop will be inflated with sour mucous and food. The liver will be much enlarged and flabby, and so tender that it will easily mash in the hand, and generally split open, and in every case is much congested. The crop and intestines are much inflamed, and the latter are filled with a greenish matter. The heart is also sometimes enlarged.

Treatment.—At once remove all affected birds to a comfortably warm room, well lighted, the floor covered to a depth of three or four inches with clean straw or like substance. Let the drink be scanty, using freely "Douglas Mixture;" allow no other water.

Dr. S. J. Parker, of New York State, gives the following excellent prescription to be given in the earlier or indigestive stage of the disease, and we advise giving it a trial as soon as the fowls show symtoms of being affected. He says: "I find it best to force down the fowl's throat Eucalyptus globulus, ten drops of the strong tincture, common salt four to six grains, and half a teaspoonful of ground cayenne (red) pepper. One dose in a tablespoonful of water to be given at once. If the dose takes effect digestion is resumed, and in twenty-four hours the fowl is relieved or decidedly better."

The droppings must be drenched with the sulphuric acid water to destroy the germs and prevent the disease from spreading. When the birds are fed they should have only cooked food. Our experience and observation leads us to believe that if they can be cured at all, this treatment will give them the best chance for life.

To Prevent Cholera:

1. Remove all the affected birds.
2. Give tonics, liver stimulants and aids to digestion.
3. Give the fowls more space. This may be accomplished by diminishing the number of fowls or by increasing the area of their range and of their houses.
4. The poultry house should be thoroughly ventilated and be kept clean and dry.
5. The buildings, yard and places of resort should be thoroughly disinfected.
6. Give the fowls a "preventive" that will destroy or render inert the poison they have taken into their system. There is nothing known that will accomplish this as quickly and effectually as coal oil. The coal oil should be given three or four times a week, as follows: Take a feeding of corn or wheat and let it soak in the oil a few hours, then feed it to the fowls or mix in soft feed one tablespoonful to two quarts of cornmeal.

Crop Bound.

Cause.—An over-amount of food given when the fowls are in good condition and when they have a ravishing appetite. Here we wish to call your attention to the danger of neglecting to feed for one or two days, then allowing the fowls access to all they can eat. Whole flocks have been exterminated from just this manner of feeding, and the owner would relate his misfortune by declaring it was cholera and advising his neighbors to have nothing to do with poultry.

The complaint is liable to affect fowls and chicks in confinement where no range is allowed, and in nearly every case the real cause is overfeeding them indigestible food. In most instances death is sure to follow, unless properly treated. It only requires about twenty-four hours for the symtoms to manifest themselves. The disease may be quickly relieved, as follows: Open the crop on the side, lengthwise, cutting a slit sufficiently long to remove all the contents, using a sharp knife. After this is done, thoroughly cleanse with warm water; then close with several stitches, care being taken not to sew the skin of the bird to the sack of the crop. Close the crop first, using coarse white linen thread; also have knot come on inside of crop; then take a few stiches in the skin. Place the fowl in dry, warm quarters; give no water the first twenty-four hours, and feed on soft food for two days. It will soon recover.

Canker.

Cause.—Badly housed, uncleanliness, musty or unwholesome food.

Symptoms.—The breaking out of cancerous running sores on the head, in mouth or throat, accompanied with a watery discharge from the eyes and mucous secretion of the mouth and throat.

Treatment.—Wash the head and eyes and swab out the mouth and throat with a diluted solution of chlorate of potash and alum, equal parts, containing one-half water, and remove the ulcers with a quill, and apply nitrate of silver or powdered borax to the places left bare, to be repeated twice a day; also mix a teaspoonful of powdered sulphur in the food.

Bumble Foot.

Causes.—This is caused by the birds roosting on a small, uneven perch, or in flying down from a high one upon a hard surface, thereby bruising their feet. It occurs mostly with the heavier varieties of fowls.

Symptoms.—It commences with a small swelling or corn in the ball of the foot, which enlarges, becomes soft and finally ulcerates.

Treatment.—Remove the bird to a place without perches. If the foot becomes ulcerated, first wash out the sore with castile soap and warm water, then dip the foot in a solution of one-fourth ounce of sulphate of copper to a quart of water; this may be repeated two or three times a day. If taken in time a cure may be effected by painting the part with iodine. When the tumor is soft or in the form of an abscess, puncture it with a knife and press out the matter, after which cauterize the part with nitrate of silver.

A linseed poultice bound securely on the affected foot will work a cure in many cases.

Leg Weakness.

Cause.—This complaint should not be confounded with the previous one. It often arises from the inbreeding of the same strain of fowls for too long a period, but is usually caused by too high feeding, which increases the weight of the body out of proportion to the muscular strength of the legs; it more generally occurs in the large breeds, such as Cochins and Brahmas, particularly in the cockerels.

Symptoms.—Squatting around on their hocks, after standing for a short time, as if tired; in bad cases they are unable to stand on their feet at all.

Treatment.—In an early stage give the following pill twice or three times a day: One grain of sulphate of iron, five grains of phosphate of lime and half a grain of quinine.

Chicken Pox.

Causes.—This disease is frequently caused by unfavorable conditions of the atmosphere, and generally occurs in cold, wet weather. It is of an infectious character.

Symptoms.—The head, face or body is covered with small ulcers, containing an infectious matter.

Treatment.—First wash with castile soap, and then with a strong solution of chlorate of potash; also mix a little pulverized charcoal and sulphur in the soft food, about a

teaspoonful of each to a pint of meal. Annoint the head with "Carbolate of Cosmoline" until cured.

Carbolate of Cosmoline consists merely of vaseline with about three drops of carbolic acid to the ounce of vaseline. Mix well.

Gapes.

Causes.—Foul water, exposure to wet, damp places, particularly at night, want of nourishing food, etc.

Symptoms.—The general symptoms, as the name implies, consist in constant gaping, coughing and sneezing, together with inactivity and loss of appetite.

Treatment.—Give the bird daily, until it recovers, a small piece of camphor about as large as a grain of wheat, and add a few drops of camphor or turpentine to the drinking water, or mix with the food, about ten drops to the pint.

Douglas Mixture.

"Douglas Mixture" is made thus: Take of sulphate of iron (common copperas), 8 ounces; sulphuric acid, ½ fluid ounce Put into a bottle or jug one gallon of water, into this put the sulphate of iron. As soon as the iron is dissolved add the acid, and when it is clear, the "mixture" is ready for use.

In hot weather, or when the flock is small, less may be prepared at once, but the above proportion should be observed. This "mixture" or tonic should be given in the drinking water every other day—a gill for every twenty-five head is not too much—and where there is infection it must be used every day, but where there is no disease, not so often, or in smaller quantities if it be used every day.

This preparation, simple as it is, is one of the best tonics for poultry known. It is alterative as well as tonic, and possesses, besides, antiseptic properties which make it a remedy as well as a tonic.

Hospital.

Every poultry yard in which, say even 100 birds are reared yearly should be provided with a place especially devoted to penning sick birds, where an invalid can be at once isolated and properly doctored. This place must be open to the sun, screened from the wind, dust dry, freely ventilated; yet free from draft, and warm. The hospital should be whitewashed with hot lime frequently, and perfect cleanliness maintained.

Diarrhoea and Dysentery.

Cause.—This is in many cases not a disease, but a symptom. Indigestion causes diarrhoea, and the first object of the poultryman who has fowls so troubled should be to think over his method of feeding. The requisites for poultry, aside from the grain and animal food that is invariably fed, is grit and green food. These two necessaries are invaluable in keeping the digestive organs in good condition.

One of the effects of lice is diarrhoea, in fact diarrhoea is a complaint that may in many cases be remedied by clearing away the droppings and dust that infest many poultry houses and harbor lice.

In some cases boiled rice will improve the condition of the fowls after the precautions named have been taken. A small quantity of cooked mash given at frequent intervals will be beneficial. Never feed a full meal of this.

If not treated upon the first symptoms appearing, diarrhoea may develop into dysentery.

Symptoms.—The symptoms of dysentery are the same as those in diarrhoea in a more aggravated form. The watery discharges become streaked with more or less blood, and general weakness is very pronounced.

Treatment.—Prevent all exposure to cold and dampness, keep everything about those affected scrupulously clean. Give milk and lime water as prepared for diarrhoea, with a half teaspoonful of whisky added. At the outset of the attack give a half teaspoonful of castor oil.

An eastern authority, writing on the subject of dysentery says: "Dysentery is due to overfeeding, by which the liver is gorged with bile and its function is arrested. The bowels are then disturbed by the presence of the bile and undigested matter, and the action of them is greatly increased, with cramps and spasms, due to the increased effort to expel the crude, offensive matter. The best thing to be done is to help nature in this, and to give a purgative, such as a small rhubarb pill, at night, inclosed in a small ball of butter or lard. As much powdered rhubarb as will make a pill, when mixed with molasses, as large as a sweet pea, is sufficient, and one should be given every evening. The food should be soft and nutritious, as oatmeal or linseed, boiled thick and given in balls, if not eaten readily. This medicine is recommended mostly for the fowl when first taken, and if a few only are affected the whole flock should be treated as a precaution. As a rule, there is but very little risk of infection, even from a closely neighboring flock, if the fowls are fed and cared for as they should be, the house kept scrupulously clean, the food good and varied, as above suggested, and not in excess; if pure water is given in abundance, and the temperature regulated so that no extremes of cold, or, indeed, of heat, are permitted, but when coddling is the rule, one may look out for sick fowls."

Congestion of the Liver.

By congestion of the liver is meant an increase in the amount of blood in the organ. Owing to the arrangement of its vessels, the circulation in the liver is influenced by the condition of the heart and lungs, and by the state of digestion. It is therefore very liable to suffer from change in blood supply.

Causes.—Excesses in eating; insufficient supply of sharp grit. The admission of irritating substances to the blood, as cayenne pepper, condition powders, etc., increase the tendency to congestion. When the heart is affected and the proper amount of blood is not forced through, an abnormal fullness of the venous system results and the liver is the first organ after the lungs to suffer congestion thus caused.

Symptoms.—A general languor is apparent; the face assumes a yellowish color; loss of appetite; diarrhoea is frequently present and great tenderness is evident upon pressure over the region of the liver.

Treatment.—Avoid all stimulants. The food should be some easily digested substance, as boiled oatmeal. Give one teaspoonful of Epsom Salts dissolved in water once daily for three days.

Congestion of the liver will frequently cure itself if the bird is given access to plenty of grit and the diet is restricted to plain foods in moderate quantities.

Acute Rheumatism.

Definition.—Acute rheumatism is a constitutional disease, characterized by fever and inflammation of the joints, occuring in succession.

Causes.—Whether dampness, cold or sudden chilling are direct causes, or are predisposing influences, is a question, but certain it is that attacks of this disease are more numerous when these conditions exist.

Symptoms.—Thirst and constipation occur. The legs become painful and refuse to support the body. Upon examination one or more of the joints are found to be hot and swollen. Very soon, probably the next day, other joints became affected, and those first attacked become less painful, and the swelling subsides. This tendency to migrate or shift

from one joint to another is the most characteristic symptom of acute rheumatism. When there are no complications, the fowls begin to improve about the fifteenth day and are restored to health in about three weeks.

Treatment.—There are a host of remedies for rheumatism. Salicylic acid in two-grain doses, in capsules, every four hours, is probably the best, but has the disadvantage of requiring too much time to administer. Another good remedy is to dissolve half an ounce of bicarbonate of potash in half a pint of the drinking water. To breed from birds subject to attacks of this disease is dangerous, as there is great possibility that the disease will manifest itself in succeeding generations.

Worms in Poultry.

The symptoms are sometimes like those of the gapes, the chick gasping for breath and sometimes coughing, but a careful examination of the wind pipe when dissected may fail to reveal any worms there. Then give the following treatment for worms in the intestines, as it has proved successful in several cases:

Two tablespoonfuls santonine.
Two tablespoonfuls sulphur.
Two tablespoonfuls powdered charcoal.
Two tablespoonfuls salt.
One-half teaspoonful cayenne pepper.
One tablespoonful powdered copperas.

Half of the above was mixed with six quarts of coarse cornmeal, scalded to a crumbly consistency and fed for supper to 200 chickens. The following morning four tablespoonfuls of sulphur was mixed with four quarts of meal, slightly moistened with warm—not boiling—water and fed for breakfast. In two days the chickens seemed more active and the cough was greatly lessened. The dose was repeated at the end of the week. It might be repeated at long intervals during the summer as a preventive measure if the malady was bad the first of the season.

Dusting with lime was tried, also smoking with sulphur, using a bee smoker for the purpose, but neither lime nor sulphur, taken by inhalation, was of any benefit.

Pip.

Pip is a symptom, not a disease. It arises from a hardening of the tongue, owing to the fowls breathing through the mouth, the nostrils being clogged by a cold. Clean out the nostrils, inject a few drops of a half and half mixture of coal oil and sweet oil and guard the fowl against taking cold.

Feather Eating.

This mischievous habit is the result of confining fowls too closely and allowing them to be idle. One preventive is to keep the fowls busy as much of the time as possible scratching for their daily bread. A strip of salt pork hung up in the hen house is a preventive and will sometimes check the trouble. Another effective remedy is to bathe the feathers that are being plucked out with a half and half mixture of whisky and aloes. Aloes can be obtained in small quantities at any drug store. As soon as the fowls are given greater liberty they will get over this habit.

Frosted Combs.

If birds with frosted combs can be treated before the frost is out of the injured parts, holding the comb or wattles in ice cold water will draw out the frost without loss of the comb or great soreness. Should the frost come out of its own accord, there is danger of the comb dying and falling off. In the case of frosted combs where soreness results, use vaseline as a salve.

Vertigo.

This trouble differs from paralysis. It is caused by a rush of blood to the head, resulting from indigestion. The fowl thus affected becomes dizzy, staggers or falls down. A cure can often be effected by holding the fowl's head under a pump, or by pouring cold water from a vessel on the fowl's head. After this treatment, confine the fowl in a dark apartment and feed nothing for twenty-four to forty-eight hours, then feed sparingly of easily digested foods.

Scaly Legs.

This is caused by small insects burrowing under the scales of the legs and toes. To have one scaly leg in a flock is equivalent to having them all affected. The insect will pass from one bird to another, and it becomes only a question of a short time until every bird has scaly legs. It does not injure the health of the birds in any way, but is very unsightly; and as the remedy is so simple and so easily applied, it denotes carelessness on the part of the attendant to allow the birds to have scaly legs. Dip the feet and legs in kerosene, and allow them to remain long enough to become thoroughly wet. Repeat this treatment in three days.

If the birds have feathered legs, it would be well to dry them, as the feathers would hold the kerosene, which would blister the legs.

Sulphur ointment is used by some, and is very highly recommended. This is applied by simply rubbing the ointment over the feet and legs and repeating twice a week till a cure is effected.

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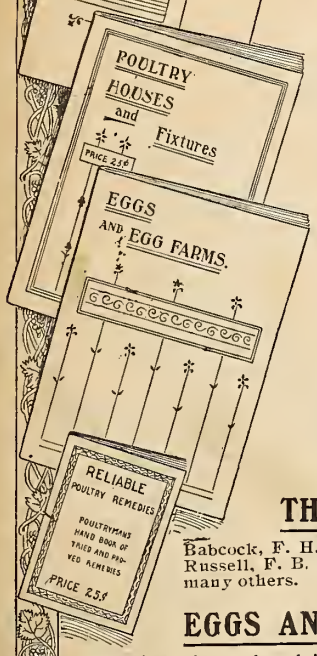

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